LATIN AMERICA

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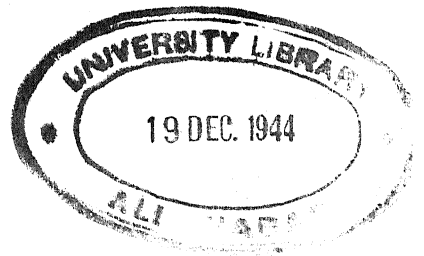
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To

WALLACE W. ATWOOD,

INSPIRING TEACHER AND BUILDER
OF THE PROFESSION OF GEOGRAPHY,
THIS BOOK IS RESPECTFULLY
DEDICATED.

PREFACE

IN A COUNTRY where foreign policy is based in large part on public opinion, the lack of a considerable group of informed citizens may become a serious danger. Such a lack exists at the present time in the United States with reference to Latin America. Most North Americans are quite out of touch with the conditions which exist in the countries which share the Western Hemisphere; and, what is worse, they accept certain caricatures as representative of the Latin-American people. Now that Anglo-Americans, Spanish-Americans, and Portuguese-Americans seem confronted with the necessity of sharing a common destiny, an immediate effort should be made to transform mutual ignorance and suspicion into mutual understanding and sympathy. No more urgent objective faces the educators of America; no more essential duty faces every citizen who can read and comprehend.

Until recently, not many North Americans were deeply interested in foreign countries. Most of the people of the United States are too remote from contacts with foreigners to know exactly how such contacts can be made. That other peoples are not to be judged by North American standards; that the effort necessary to study and arrive at an understanding of other peoples' ways of living is worth while; that other peoples might not actually desire to imitate the material achievements of the United States—these are concepts which are little understood, however often the words may be repeated either in the schools and colleges, or by civic organizations intent on programs of foreign study. Many of the North American tourists who travel in increasing numbers wherever travel is permitted are not prepared to understand the conditions they observe and all too often return home with their prejudices and pre-

conceptions fortified by unfair comparisons and by the memory of unpleasant experiences. Moreover, North Americans are notoriously ignorant of the languages other people speak. Too great an emphasis on United States history and a widespread neglect of elementary geography leave most of the people of the United States perilously unprepared to form opinions on questions of foreign policy.

Yet somehow we must learn promptly to understand and appreciate the other Americans who also live in the New World. We must learn, before it is too late, that Latin America is not a rich territory waiting to be exploited by North American business genius; we must learn that Latin America is not just a backward pioneer land, following the same course charted in so spectacular fashion by the frontiersmen of the United States; we must learn that Latin Americans had universities, printing presses, libraries, and other evidences of civilization at least a century before these things appeared in the rough woodland communities of eastern North America; we must learn that the cultural connections of Latin America are much closer with Europe than with Anglo-America; finally, we must learn that the conditions of land and people are so diverse throughout Latin America that no simple generalizations can be used to describe the manners and problems of living which are encountered there.

The late Max S. Handman, who possessed a rare understanding of the relative merits and weaknesses of the peoples of Anglo-America and the peoples of Latin America, wrote as follows: "The desire to accumulate property goes with the ability to accumulate it, and with a stable social and political organization which will guarantee the safety of such an accumulation. The Latin Americans are not poor because they are lazy and have unstable governments, but they are lazy and afflicted with political instability because they are poor. Those Latin-American countries or regions which show the greatest wealth are also the countries of greatest political stability. Fundamentally, however, the greatest cause of poverty in Latin America is the low degree of productivity, the prevalence of poor health and malnutrition, the technical backwardness, and lack of accumulated capital. Many of the other things which are held against Latin Americans would, under other circumstances, turn out to be great qualities rather than deficiencies. Their fundamental artistic sensitiveness, their appreciation of refinements of thought and feeling, their keenness in understanding and loving nature, their mature willingness to put limits to activity, to prize meditation, and to find a place in human life for even a touch of mysticism—all these may be traits which, when combined with a wholesome respect for human life

and human labor, and a more receptive and understanding insight into the North American passion for production and material achievement, would result in the creation of a new set of cultural values which may be the very values of which the world stands in need at this critical hour."

In many respects, to be sure, Latin Americans are remarkably similar to Anglo-Americans. It may be that the reader of this book will find too much emphasis placed on the differences which distinguish one group from another. After all, there are certain fundamental similarities which link together all members of the human race. Human beings of whatever color or nationality are actually moved by much the same fundamental forces, and the societies they build have a great many elements in common. There is always the same overwhelming triviality of daily living; there are always the moments of unselfish idealism which illuminate the drab monotony of human existence. Perhaps if we stressed these similarities more and the differences less, there would be less room for fear, and for that terrible result of fear—hatred. We must recognize that among the peoples of the Americas there are many common experiences and many common aspirations which can serve as a basis for the development of friendships and of mutual confidence and respect.

But this book deals with the arrangement of people on the land; and since a geographer is interested primarily in the significance of the factor of location in human affairs, he must inevitably stress the distinctions, the contrasts, the elements which make one place, and the people in it, different from another place and from other people.

In this study of human geography—of the arrangement of people on the land—there are certain general themes, all set forth in the introductory section. These themes have to do with the pattern of population, and the relation of this pattern to the various factors which have combined to produce it. In this book geography is treated historically, for to understand the present arrangement of people, we must go back to origins and trace developments. But as we move from country to country, and from region to region within the countries, we find that each separate area of human settlement possesses a distinct individuality —an individuality created by differences in the nature of the people, differences in the nature of the land, and differences in the experience these people have had in their effort to form workable connections with the land. Each country and each region offers a variation on the basic themes; and little by little as we proceed we find that these variations are of more fundamental importance than the themes themselves. The themes give us a frame of reference, an orientation; but an understanding

of the problems, accomplishments, and present conditions of the Latin-American societies can only be had in terms of the specific characteristics of specific areas.

An important feature of this book is the maps. In addition to general maps showing South America as a whole, or Middle America as a whole, there are a large number of more detailed maps showing on a large scale the various areas of concentrated settlement. These larger-scale maps do not cover all of the area of Latin America, but they do cover all of the areas of concentrated settlement. In most cases, these maps of the areas of concentrated settlement are prepared in series. The first of each series is a map of surface configuration; the second is a map of natural vegetation; the third is a map of land use, including the places where mining is being actively carried on; and the fourth is a map of population. In each series uniform base data make possible the close comparison of one place with another. The names of towns and natural features are shown on the maps of surface configuration; on the three other maps in each series the location of towns and cities is indicated only by dots. An exception to this rule, however, is made in the case of mining communities, which are named on the maps of land use. The names of major political divisions (states, provinces, or departments) are shown on the maps of population. With only a very few exceptions all of the places mentioned in the text are shown on the maps. The reader is referred to the index for a quick guide to the location of place names and geographical features.

These maps are the result of compilations of data from a great number of sources. The list of references actually used is much too long to be included, especially since it would be of little interest to the average student or to the general non-professional reader. The relative reliability of the maps varies greatly from region to region; and even in the parts of Latin America where the data are most reliable and where adequate base maps exist on which to plot these data, the refinements of geographic study possible in many parts of Europe, in Japan, and in some parts of North America, cannot be undertaken. None of the maps, therefore, can be considered a final product of careful scholarship: each is subject to correction on the basis of more complete observation in the field and of a more critical selection of significant criteria.

The population maps, which are an essential part of this geographical study of Latin America, also differ in the degree of reliability. In few parts of Latin America have censuses been taken which provide accurate data for small civil divisions. In many cases the figures are available

only for large statistical units, and in not a few places the figures are given with reference to areas which are not definitely delimited. Under these circumstances the writer decided that the construction of maps of population density was not warranted. Either such maps would have to be drawn with highly generalized lines, or they would give a false impression of accuracy. The dot map, on the other hand, offers greater flexibility where the data are not closely related to small and exactly defined areas. Although the dots are given specific values (generally one thousand rural people per dot), it is not intended that the reader should be able to count the number of dots in a specific area. Where population data are given only for large units, the arrangement of the dots within these units is based on estimate, supported by such other data as field notes, and the maps of surface, vegetation, or land use. The general picture of population distribution thus presented is probably not far from reality, although it is subject to correction in detail as more accurate statistical materials become available.

In a period of more than twenty years, the writer has enjoyed four field seasons in different parts of Latin America and shorter visits to other parts. Actual field studies were made in Peru, Northern Chile and Bolivia, on the island of Trinidad, and in the southern part of Brazil, south of latitude 17° S. For the financial support which made these field studies possible, the writer is indebted to research grants from the University of Michigan, from the Horace H. Rackham School of Graduate Studies at Michigan, from the National Research Council, and from the Social Science Research Council.

The writer has been assisted by important criticisms and suggestions from a number of geographers, historians, and others. During the early years of the project, the late Professor Max S. Handman was a constant source of inspiration and guidance. Among the geographers who have given assistance in the preparation of parts of the manuscript are Stanley D. Dodge, Carl O. Sauer, Samuel N. Dicken, Robert B. Hall, Leo Waibel, and Earl Hanson. The historical material in certain parts of the book has been reviewed critically by Professors Arthur S. Aiton and Clarence H. Haring. The writer is indebted to the anthropologist Professor Mischa Titiev for assistance in the sections dealing with the Indian cultures. The sections on Brazil were read and criticized by Professor Carlos Delgado de Carvalho; and the section on Colombia by Dr. Daniel Samper Ortega. To all these men who have given invaluable aid, the writer is deeply grateful.

Gratitude also should be expressed to those diplomatic and consular officers of the Latin American Republics resident in the United States who made possible the reproduction herein of the authentic coats of arms of their respective countries.

Except for four maps prepared by Professor Erwin Raisz, and certain other maps borrowed from previous publications, the draughting for this book was done by Mrs. Eileen L. Johnston. For her patient and painstaking work, and for her forbearance in dealing with an author who could never resist making additions and changes even after the maps had been completed, the writer offers his sincere appreciation.

PRESTON E. JAMES

Ann Arbor, Michigan
December, 1941

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GENERAL INTRODUCTION

THE INDIANS in the highlands of Colombia used to hold a strange ceremony. The tribal chieftain, after suitable preparation, covered his body with a sticky gum and powdered himself with gold dust. He then plunged into the water of a lake which was held sacred by the Indians and washed off the covering of gold. At the same time his subjects made offerings to the gods by throwing gold objects into the lake. This was *El Dorado*, the Gilded Man. The story of this rite was passed on from one to another among the Spanish explorers and lost little in the telling, until El Dorado became so powerful a legend that men spent their lives, and in many cases lost them, in the frantic search for the sacred lake. The gold has never been found.

In the course of more than four centuries El Dorado has become more than a curious Indian legend—it has become a symbol, like the buried treasure of the pirates, a symbol of a way of living. For all these centuries the people of the various European nationalities who conquered and overran the Americas have believed in the existence of great accumulations of potential wealth. At first these accumulations were sought and found in the centers of the more advanced Indian civilizations, such as those of Mexico and Peru. Later the search was directed to those rich resources which are accumulated by nature. In either case the rapid and profitable exploitation of a source of wealth soon led to the destruction of that source. Mining is a destructive economy, for the ores once removed are not replaceable; mining methods applied to agriculture use

up and destroy the accumulated fertility of the soil. The exploitation of natural or human resources by methods which are destructive is accompanied by sudden spurts of speculative prosperity and by disastrous declines, and results in an economy which is inevitably unstable and lacking in permanence. This instability is a common characteristic of pioneer lands where resources are supposed to be great and population is scanty. As settlement in a land continues, a stage may be reached when new resources awaiting development are few and population is large enough to demand attention to the conservation of resources. But in Latin America there is just enough truth mixed with the flights of fancy regarding the wealth of resources to keep alive the hope and the pursuit of buried treasure. The spirit of El Dorado dies slowly.

Latin America is not a new land. This is a fact which many North Americans find difficulty in understanding. Some of the lands which lie to the south of the United States had been exploited and abandoned by the Indians before the arrival of Columbus. In the centuries which followed Columbus the so-called "New World" was ransacked by Spaniards, Portuguese, English, French, Dutch, and other peoples of European origin. There are many parts of Latin America for which up-to-date information is lacking, for which there are not even reliable maps; but there are few parts which have not been explored and exploited first by one group and then by another. Actually Latin America is not a virgin land, awaiting the arrival of the pioneer—it is an old land, tramped over, many of its sources of accumulated treasure exploited and abandoned, many of its landscapes profoundly altered by the hand of man. Yet it is a land in which large areas remain comparatively empty of human inhabitants.

Now, more than four hundred years after the nations of Western Europe began to plunder the New World, three chief groups have emerged in political control of the larger part of the hemisphere: the Anglo-Americans, the Spanish Americans, and the Portuguese Americans. In the twenty-one independent states included in the Pan American Union there are approximately 258,000,000 people. Of these about 132,000,000 are in the United States. Latin America has about 78,000,000 people in states which are descended from Spain, about 45,000,000 people in Portuguese Brazil, and about 3,000,000 in the Negro republic of Haiti, which was once a colony of France. In addition there are some 5,000,000 people in small units still under the sovereignty of European nations or recently acquired by the United States.

International events have made it imperative that we, in Anglo-America,

become acquainted with the conditions and problems faced by the other Americans. We need to know, first of all, why there are so few people in Latin America. Why are they concentrated in certain parts of Middle and South America, while great expanses of territory remain only very thinly populated? Why does the frontier still survive in so many regions after more than four centuries of settlement? How have these other Americans adjusted themselves to the qualities of the land itself? What sort of attitudes and technical skills did they bring with them from the Old World and what ones have they adopted in the New World? What kind of states have they formed: strong ones or weak ones; states which have become coherent and orderly nations, or states which are composed of chaotic and uncoördinated elements; states which have made effective use of the opportunities offered by the land, or states which have struggled in poverty in the midst of potential plenty? And have the citizens of these states yet learned the fundamental fact regarding El Dorado—that lands and resources are turned into permanent sources of wealth only by human energy and ability; that the sacred lake exists only in the minds of men? These are the questions we wish to ask about these people who share with us the protection afforded by a common ocean from the chaos of a collapsing Europe.

PRINCIPAL CHARACTERISTICS

People and land are the basic elements of the story. A human society is not understandable unless it is considered in relation to the land it occupies; nor is the significance of the land with respect to human settlement determined without reference to the varying kinds of human societies. In Latin America four principal characteristics may serve to summarize the conditions of the people and the land.

I Relatively Small Population

One of the first facts to be observed in Latin America is that the population is relatively small. The eight million square miles of land in the part of the Western Hemisphere which lies south of continental United States represents about 19 per cent of the total area of the world's inhabited continents; but the one hundred and thirty million people make up only about 6 per cent of the world's population. The largest political unit in Latin America both in area and in population is Brazil; yet Brazil's forty-five million people—approximately equal to the number of people in Italy—occupy a territory which is as large as all of Europe without

the Scandinavian Peninsula, and larger than that of continental United States. Only two countries in mainland Latin America make effective use of all parts of their national territories—these are little Salvador and Uruguay. Vast stretches of the South American continent have almost no human inhabitants.

II Population Pattern One of Isolated Clusters

The people of Latin America are characteristically grouped together in clusters, in areas of concentrated settlement, and these clusters for the most part remain distinct from other clusters, being separated from them by scantily occupied territory (Map 1).*

A population cluster is the most elementary arrangement of people on the land. Human beings generally prefer to live together in groups rather than to scatter at such intervals that contact with one another is difficult. The normal pattern of Occidental settlement in a pioneer land is one of scattered clusters, commonly strung together along a line of travel. Friis has recently published a series of maps showing the clustered pattern of eastern North America which persisted until about 1700.[1] A population map of Europe in the early period of northward penetration from the Mediterranean would show a similar pattern. In the course of time the original areas of settlement of Europe and of eastern North America were enlarged until they grew together, little by little filling in the scantily occupied territory which once separated them; but in Latin America the clusters still remain generally distinct from one another in an elementary pattern which has never been filled in.

Even the areas of concentrated rural settlement in Latin America have a relatively low density of population. Some of the islands of the West Indies, to be sure, rank among the more crowded portions of the earth. Barbados, with more than a thousand people per square mile, and Puerto Rico, with more than five hundred, approach the densities more commonly associated with such places as Java and India. Outside of the West Indies, however, only a few of the regions of concentrated settlement of Latin America have rural densities of more than one hundred and twenty-five people per square mile. These few places are: the central area of Mexico (Map 144)*; the highlands of Guatemala and El Salvador; the intermont basins of Costa Rica; the Antioquia region of Colombia

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*Maps 1 and 2 are on the lining papers at the front of the book; Map 144 at the end of the book.

[1] Herman R. Friis, "A Series of Population Maps of the Colonies and the United States, 1625–1790," *Geog. Rev.*, XXX (1940), pp. 463–470.

(Map 1); possibly some of the high basins of the Peruvian Andes, and certainly a part of the borders of Lake Titicaca; the Cochabamba Basin of Bolivia; parts of northern Middle Chile; the oasis of Tucumán in Argentina; and parts of the northeast coast of Brazil. But most of the population clusters of Latin America have a rural density of less than one hundred per square mile—and in many cases the density is less than twenty-five.

In the midst of each of the population clusters, even the smallest, there is an urban core or nucleus, and because the areas of concentrated settlement still remain distinct from one another, there is little overlap between the territory served by one city and that served by a neighboring one. In Europe and North America where the originally distinct areas of settlement have lost their obvious identity through expansion and the establishment of contact around the margins with other areas of settlement, the problem of separating the territory which is related to one center from the territory of another is very difficult. Commonly there is a wide zone of overlap between neighboring cities in retail trade, newspaper subscriptions, professional services, and the variety of other activities which are performed in an urban center for the people of the surrounding territory. But in Latin America this sort of overlap is rare: the economic, social, and political life of a region commonly focuses on only one large central city, and as a reflection of this the local lines of travel also converge on this one center.

Some of the cities appear to be surprisingly large when viewed in relation to the low density of the rural population in the surrounding area. Although there are many towns with a population of less than ten thousand, there are some which have achieved the right to be included among the world's great metropolises. Four cities have more than a million inhabitants: Buenos Aires, Rio de Janeiro, São Paulo, and Mexico City. There are thirty-three cities in South America (Map 3) and fourteen in Middle America with more than one hundred thousand population. Urban development in Latin America, in the light of European or North American experience, seems to be out of proportion to the population density of the hinterlands which are served.

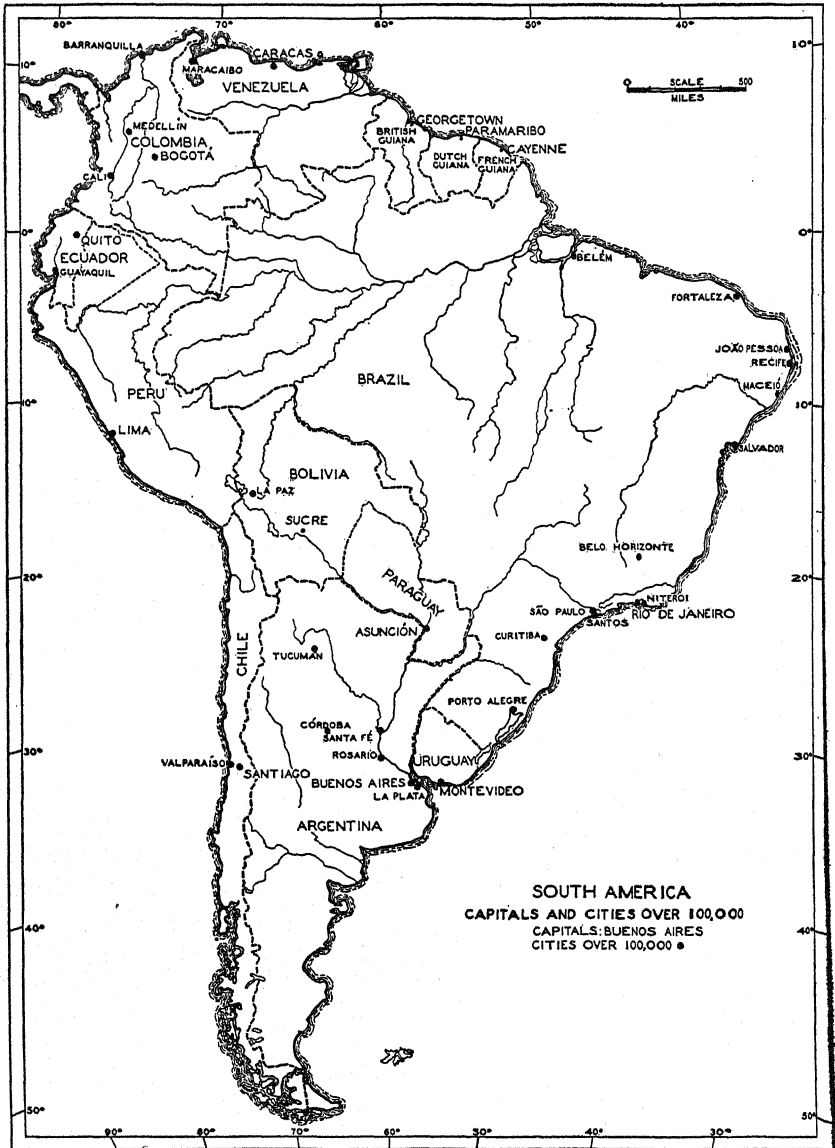
Today the urban nucleus of a Latin-American area of settlement exerts such a strong attraction that the tendency is for people to move in toward that center rather than to expand the frontier into a new pioneer zone. There are many expanding frontiers in Latin America, but most of them are hollow ones, that is, they represent waves of exploitation moving across a country, followed by abandonment and population decline.

Such is the sugar frontier of Cuba, or the coffee frontier of São Paulo. These frontiers produce no net gain in the density of settlement. There are, however, in four parts of mainland Latin America—that is, excluding the West Indies—zones of concentrated settlement which are expanding, and their expansion is not accompanied by a decrease of the density of population in the original nuclei. These four places are: the highlands of Costa Rica, the highlands of Antioquia in Colombia, the Central Valley of Chile, and the three southern states of Brazil. Because expanding frontiers which are not hollow are so rare in Latin America, these four areas will merit our close attention.

The clustered pattern of population bears a simple relationship to the political units. In certain countries this characteristic is remarkably well developed: only one central cluster of people marks the core of such political units as Chile, Uruguay, Paraguay, and El Salvador. In most of the countries the population clusters form the cores of the major subdivisions—states, departments, or provinces. It is less common to find two clusters in one state, or one cluster divided between two states. Notable exceptions can be observed in the central area of Mexico and the highlands of Peru.

One result of this simple relation of the population pattern to the political areas is that the political boundaries generally pass through the scantily occupied territory between the clusters. There are few parts of Latin America where the boundaries cut through the midst of areas of concentrated settlement, and national boundaries do this even more rarely than state boundaries. The fact that areas of relatively dense population are cut by national boundaries in three places in Latin America is another exceptional condition which merits special attention. These places are on the border between Venezuela and Colombia, Colombia and Ecuador, and Peru and Bolivia.

A second result of the clustered pattern of population is the necessity for recognizing two kinds of political area. There is the *total national territory* over which a politically organized group claims jurisdiction—the whole area within the national boundaries. But only that part of the total territory which actually contributes to the economic support of the citizens of the country can be called the *effective national territory* (sometimes called the *ekumene*).

Finally, a third result of the clustered pattern of population is the nature of the transportation problems which Latin Americans have to face. Throughout most of South and Middle America the overland routes of travel lead from the interior to the nearest or most accessible

MAP 3

ports; the land routes which connect one region of concentrated settlement with another, even within the same country, are developed only poorly. Transportation lines across the sparsely inhabited spaces between the clusters of population can, of course, be built and maintained at government expense as a military precaution or a diplomatic gesture;

but only where traffic originates in sufficient quantity along the line can it be supported on an economic basis. To be sure, automobiles and motor trucks are making these overland connections easier than before, since roads are less costly to build than railroads. But such a long inland route as the proposed Pan American Highway is all the more spectacular as a project and as a subject for diplomatic eloquence because such connections between the separate areas of concentrated settlement are still very rare.

The fact remains that the chief highways of approach to Latin America and the chief lines of connection between the isolated centers of population are the oceans. Even if airplanes are now changing the nature of the transportation problem for passengers and mail, the movement of commodities is still largely dependent on ships.

Whether the approach to Latin America from other parts of the world is by ship or by air the relative remoteness of the continent must be observed. South America is literally one of the ends of the habitable earth. Its closest neighbor is the commercially unresponsive shore of Africa. Furthermore, South America is equally remote from the centers of commercial activity in the modern world which are located on either side of the North Atlantic in eastern North America and Western Europe. The fact that South America is connected by land with North America does not in reality bring it any closer to this northern part of the Western Hemisphere than to Western Europe. The Isthmus of Panama, important as it may have been in providing a land bridge for the migration of the Indians, is of no importance today as a line of overland communications—in fact, it forms only a barrier to the sea routes. And South America lies almost wholly east of the easternmost part of the United States, so that the ports of such east-coast countries as Brazil and Argentina are actually closer to Europe than to New York.

III Racial and Cultural Diversity of the Latin-American People

The population clusters appear on the map to be all alike; but actually they are composed of an extraordinary variety of racial and cultural elements, combined in many different proportions. This diversity of race and culture constitutes the third of the principal characteristics of Latin America. Race mixture has gone on with little restriction or taboo, and today more than half of the one hundred and thirty million Latin Americans are of mixed ancestry. Furthermore, the ingredients are highly diverse. There are, to be sure, the three main elements—Indian,

Negro, and white or European (including people born in America of European ancestry); but each of these elements includes a wide variety of kinds of people.[2] The mestizo is the most common racial type, if he can be called a type, to be found in present-day Latin America. Let us consider the elements which have entered into this hybrid.

The Indians

Long before the arrival of the Spanish and the Portuguese explorers the Americas had been occupied by people from Asia. Because Columbus thought he had discovered India, the people he found were called Indians. These native Americans had come into the Western Hemisphere by way of Bering Strait. Although some tribes wandered off toward the east, the main current of repeated migration led southward, some groups even pushing across Central America into South America. There is little probability that any important numbers came by boat across the Pacific Ocean, and even less probability that any came from Africa across the Atlantic.

In spite of certain general similarities among all these native peoples of America there were wide differences both in physical character and in culture. To be sure, all the American Indians had certain common physical characteristics, such as a reddish brown or yellowish brown skin, and straight black hair. None of the American native cultures included knowledge of the Asiatic domestic animals other than the dog, and none of them included the use of the wheel. Beyond these general similarities, however, the cultures ranged from very primitive to advanced, from simple to complex. The tribes of the southern tip of South America, which subsisted largely on shellfish, are classed far back in the Stone Age. These were the most remote from Asia and presumably had started their migration very early, being pushed on by their more advanced successors until they had reached what is literally one of the ends of the earth. In contrast, certain of the native peoples of America were able to take a step which only a few groups in the whole history of mankind have been able to take—they had lifted themselves "from barbarism to civilization." These more elaborate cultures were developed by the *Mayas* of Guatemala and Yucatán, the *Aztecs* and certain other groups in central and northwestern Mexico, the *Chibchas* of highland Colombia, and the *Incas* of the highlands of Peru, Ecuador, Bolivia, and northern

[2] In Spanish America, the mixture of Indian and European is called a *mestizo;* the mixture of Negro and European is called a *mulatto;* and the mixture of Negro and Indian is called a *zambo.*

Chile. The territories occupied by these four outstanding Indian cultures are shown on Maps 4 and 112.

The cultural advance these four Indian groups were able to make was reflected in a great increase in the numbers of people who could gain a living from the land; something like three quarters of all the native peoples in America at the time of the European conquest were located in the territories of these four advanced cultures. The obvious explanation is that a sedentary agricultural economy supports many more persons per square mile than does an economy based on shifting cultivation or on migratory hunting and fishing. Each of these cultures was based on that distinctively American food grain, maize.[3] The Mayas were perhaps among the first people to domesticate the wild grain and initiate the cultivation of maize. In addition, the natives of America also made use of manioc,[4] beans, potatoes, sweet potatoes, squash, tomatoes, tobacco, and cacao. These other crops, however, were not so universally known throughout America as maize.

The Maya, the Aztec, and the Inca states had all reached and passed the zeniths of their development before the arrival of the Europeans. The Mayan civilization, which was the oldest of the three, was already decadent in 1492. The empires of the Aztecs and of the Incas had been formed by the conquest and assimilation of formerly separate and distinct Indian groups—a process similar to that which marked the growth of such European "nation states" as Britain, France, and Germany. The nucleus of the Aztecs was in the Basin of Mexico, and from this place political control had been extended over a wide area. The Aztecs belong to the linguistic family known as *Nahua*, but their empire did not include all the Nahua-speaking tribes of Mexico. The Incas had extended their conquest from an original nucleus in the Basin of Cuzco, and had brought together in one great state the various tribes included in the two linguistic families, the *Quechuas* and the *Aymaras*. But at the time of the Spanish conquest the Inca state was already torn by civil strife.

The parts of America outside the territories of these four relatively

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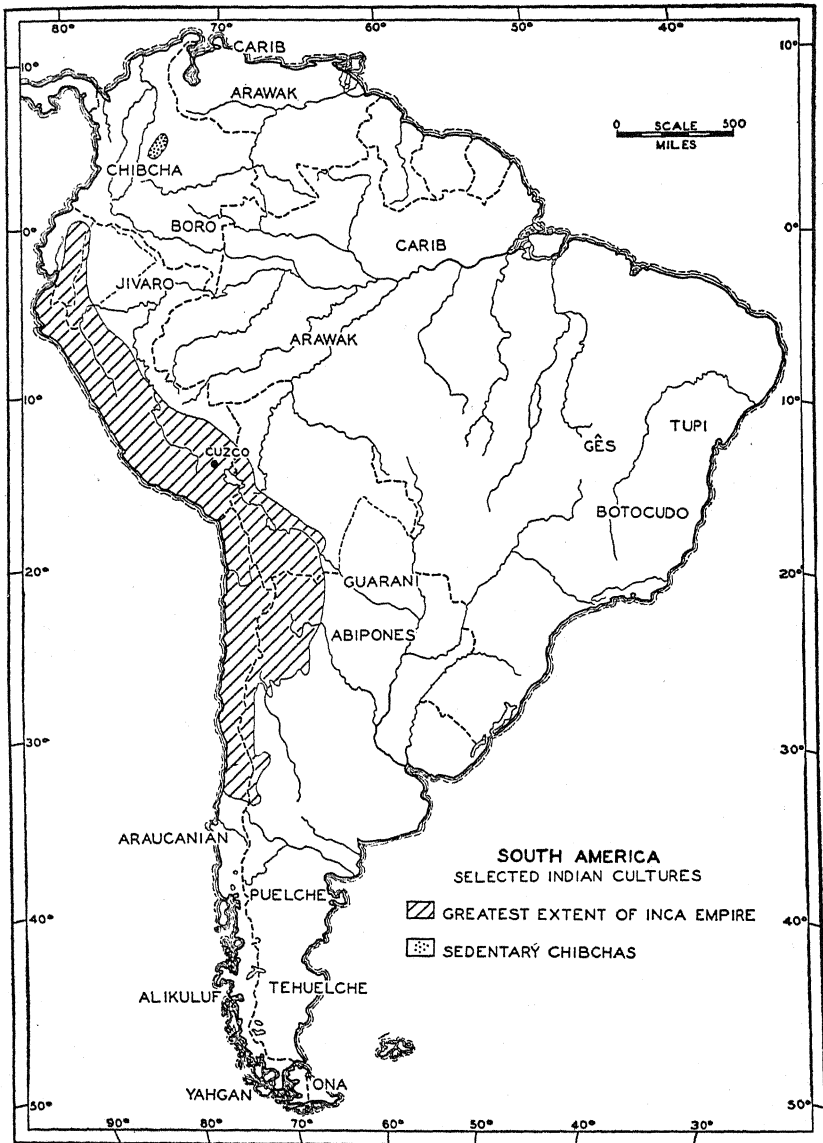
[3] *Maize* is the word which refers specifically to the grain which we, in the United States, commonly call Indian corn, or simply corn. According to general English usage, however, corn refers to any common grain. In England corn is used to refer to wheat. In this book, therefore, we shall use the Indian word *maize* to designate Indian corn.

[4] Manioc is also known as manihot, mandioca, cassava, and yuca. The latter is not to be confused with yucca, a genus of the family *Liliaceae*. Manioc is a plant with an edible root which furnishes a starchy food now widely used throughout the tropics, but formerly known only in the Americas. It is now produced commercially as the source of *tapioca*.

Map 4

advanced Indian cultures were only very thinly occupied. The greater part of the area of the Americas was occupied by a large number of separate Indian groups, only vaguely related in certain broad linguistic families. A few of the more important Indian cultures are shown on Maps 4 and 112. The tribes of tropical America ranged from semi-

nomadic hunters, fishers, and primitive farmers, such as the Caribs and Arawaks of northern South America and the West Indies, to shifting cultivators whose basic food crop was manioc, such as the Tupi and the Guarani of Brazil and Paraguay. In southern South America, in addition to the very primitive peoples of Southern Chile, there were semi-nomadic hunters and fishers who practiced some incidental farming, such as the Araucanians of Chile, and there were warlike nomadic hunters, such as the Abipones and the Puelche of the Argentine plains, whose chief food supply was derived from the wild guanaco. All these varied tribes together, however, made up only about a quarter of the inhabitants of the Western Hemisphere at the time of Columbus.

The Europeans

Diversity of race and culture in present-day Latin America is to be attributed not only to the native inhabitants but also to the European conquerors. There are many important contrasts to be noted between Spaniards and Portuguese; and both these groups, before they left the Old World, had already developed an extraordinary diversity of racial and cultural elements.

The Iberian Peninsula, the homeland of the Spaniards and the Portuguese, affords an easy passageway between Europe and Africa, and this was crossed repeatedly during the course of history by peoples of greatly contrasted origins. In the centuries between the struggle of Rome and Carthage and the discovery of America, the Celtic inhabitants of Iberia were mixed with other peoples from Europe and North Africa. First came the Carthaginians, then the Romans. The collapse of the Roman Empire permitted the invasion of Iberia by successive waves of "barbarians" from the north of Europe, the last of which waves consisted of the Goths. Then came the Moorish invasion from Africa which swept even across the Pyrenees into what is now southern France. Except for certain Christian Gothic states in the northwestern part of the Iberian Peninsula where the kingdoms of León and Castile were set up, and except for the border "march" maintained by the Franks in what is now Catalonia in the northeast, the Iberian Peninsula came under Moorish rule. Little by little, however, the Christians succeeded in pushing back the Moors, and in establishing estates ruled by feudal lords and protected by *caballeros*, or fighting men equipped with arms and horses. The Moors, forced to retreat step by step toward the south, were finally defeated (1492), and their long period of rule was ended; but for eight

hundred years before the discovery of America the political and economic life of Andalucía in southern Spain had been dominated by these people of Moslem faith.

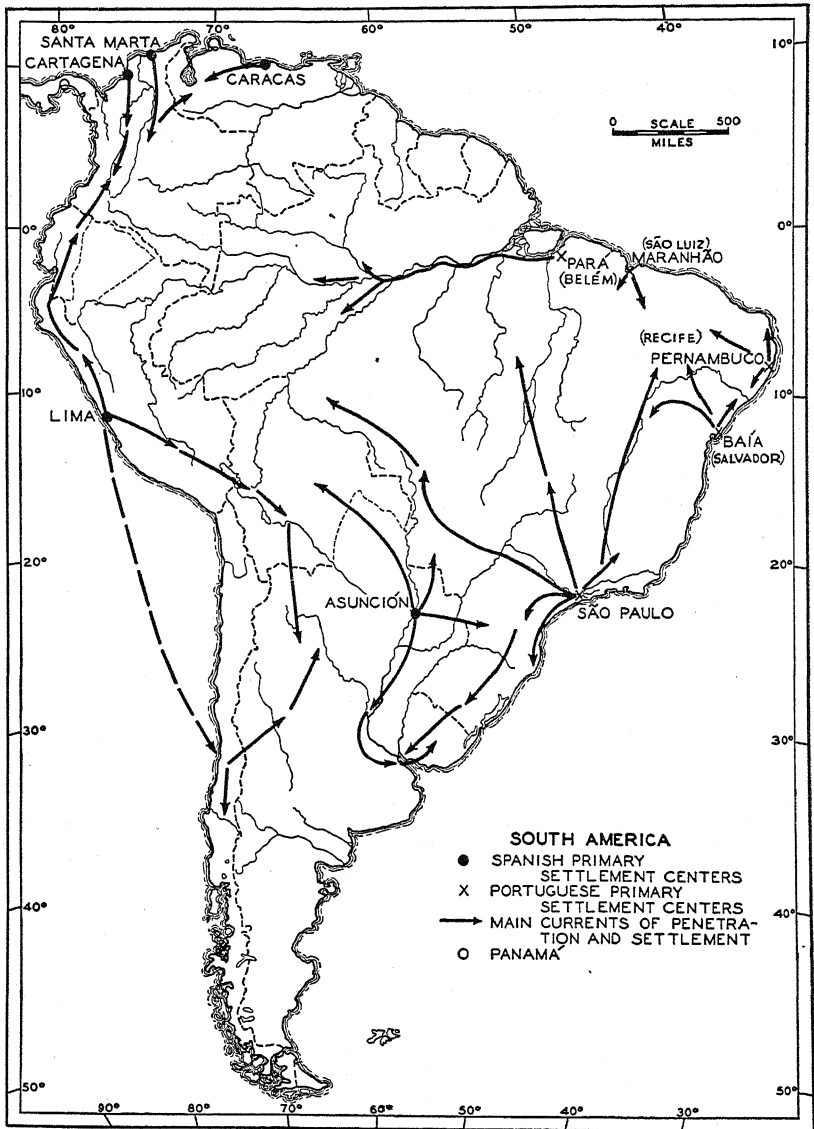
Because a majority of the people who migrated to the New World during the first century of the conquest came from southern Spain and southern Portugal the traits inherited from the Moors are of particular importance in a study of Latin America. One of the first effects of Moorish rule in Iberia was a change in agricultural practices: irrigation systems were built; fertilizer was applied to worn-out soils; and many agricultural techniques from Oriental lands were adopted. New crops were introduced, such as rice, sugar cane, and cotton. Skilled technicians from Damascus made Córdoba famous for its fine steel. From the East, also, Moors brought the manufacture of paper to Europe. Moorish and Semitic scholars made the University of Córdoba a cultural center which was perhaps unequalled in the whole world in that period, and in the libraries of this and other cities they stored the books which preserved Greek philosophy and science for the Western World. To Iberia came also Jews fleeing from persecution in Christian Europe, and Syrians, Egyptians, and many others, including black slaves from across the Sahara. All these varied racial and cultural ingredients were mixed and fused to form a new kind of people.

One can scarcely understand the Spanish or Portuguese conquest of the New World without a consideration of the centuries of conflict between Christians and Moslems which immediately preceded the discovery of America. Spanish society was grouped in small, semi-independent units, each unit under the control of a lord. In each group society was sharply divided: on the one hand were the aristocratic landowners and the *caballeros* who supported them; on the other hand were the serfs, bound to the land, dependent on the lords and the fighting men for protection. The ownership of an estate, or service in the army or in the church—these were the roads to prestige. Commerce and industry were left to the Jews and Moslems, and in the cities whole districts were set apart for these people. But Christian intolerance of the infidel was mounting, even when the infidels were providing the chief economic support for the whole system, and in 1391 the active persecution of the non-Christian elements began in earnest. Many Jews and Moors chose to become *cristianos nuevos*, or "new Christians"; many more were massacred. Among the Christian knights there developed a fanatical zeal for the spread of the Faith; but in the process the financial stability of the country was upset.

European Conquest of America

Two important events took place in 1492. The Moors were finally defeated in battle and forced to give up Granada to the Christians; and Columbus discovered America. It has been said that "Greed, Gold, and God" were the motivating forces which led the Spaniards into the New World. There can be no doubt that many of the conquerors were excessively greedy, especially those who, like Pizarro, conqueror of Peru, were not landowners at home, and who sought in America to achieve a coveted position in the aristocracy. There can be no doubt that there was need of gold, even among the people of highest social position, to repair the wrecked finances of Andalucía. There can be no doubt that many of the Spaniards who had been raised during the century of bitter conflict with the infidels came to the New World with a sincere, if fanatical, desire to kill infidels, or to convert them to the service of God. And there can be no doubt that both the Spaniards and the Portuguese, in common with most of the other European peoples, showed a marked reluctance to engage in that persistent hard labor which is required for the creation of a permanent society on an agricultural base.

For a people with these characteristics and attitudes the relatively dense populations of sedentary Indians in the areas dominated by the Aztecs, the Mayas, the Chibchas, and the Incas exerted a special attraction. These peoples had already accumulated stores of what the Spaniards thought of as treasure. The Indians of these advanced states, moreover, were ready, after a brief struggle, to accept conversion to Christianity and to go to work for their new masters. To be sure the Indians had no concept of private property in land, no concept of the commercial value of gold and silver, and these new ideas must have seemed as fantastic to them as men on horseback. But the great majority of the Indians had long been accustomed to work for their rulers, and the conquest was at first only a change of rulers.

The distribution of Indians, therefore, was the most important single factor which determined the centers and lines of the Spanish conquest. The newcomers, after landing on the shores of the Gulf of Mexico and the Caribbean, pushed their exploring parties far to the north and to the south. Within the first century most of the great sources of precious metals had been discovered and partly exploited. From the southern part of South America as far north as the present border between the United States and Canada, the Spaniards combed the new land for sources of wealth, motivated always by the hope of finding El Dorado. These

MAP 5

Spaniards were not a soft people. They were not the kind of people to seek the easy way. It is quite beside the fact to insist that they sought to avoid the heat of the tropical lowlands, and that they ascended to the highlands to escape the discomforts of the lower altitudes. They were not stopped by heat, by cold, by steep slopes, by jungle swamps, or by

warlike opponents. They were, however, attracted by the areas already well populated with infidels, where their form of society might be established with a laboring class already at hand. The distribution of Indians provides the clue to an understanding of the direction of the Spanish conquest.

Meanwhile, the Portuguese were settling Brazil. As a result of the Treaty of Tordesillas between Portugal and Spain (1494) the Portuguese had the right to all lands which might be discovered east of a line drawn north and south 370 leagues west of the Cape Verde Islands—approximately the present 50° west longitude. The Portuguese began slowly to colonize the eastern coast of South America. By the time of the discovery of America the Portuguese in Europe had achieved a much greater degree of national unity and coherence than had the Spaniards; their interest in the New World was less in the possible spread of Christianity and less in the opportunity it offered to implant their institutions than in the discovery of new and profitable sources of wealth with which to bolster the fortunes of the homeland. In eastern South America they did not at first discover any gold or silver, and they found an Indian population which was much too small to supply the necessary labor for the production of crops. Yet the Portuguese on the coast of northeastern Brazil set up the first plantation economy in the New World. They began the production of a single big commercial crop for sale in a distant market, with a system based on cheap land and cheap labor. The crop was sugar cane, and the labor was supplied by Negro slaves imported for the first time into America from Africa.

Thereafter sugar became so profitable that it attracted numerous competitors. The Spaniards planted cane in many places, and in most of these places they, too, imported Negro slaves. During the seventeenth century several of the other nations of Western Europe began a mad scramble to grab profitable sugar colonies in tropical America. The Dutch actually occupied a part of Brazil's northeast coast until they were ejected by the Portuguese. The English were successful in taking Jamaica from the Spaniards. The Dutch, the French, the English, and the Danes established their claims in the West Indies and the Guianas where Spanish and Portuguese settlement had not been effective. At this same time, the English began the settlement of the neglected east coast of North America.

Recent Immigration

Still more recently, another element contributing to racial and cultural diversity has been added to the population of Latin America. During

the nineteenth century and the present century new immigrants from a number of European countries and from Japan have come to the New World. Although an overwhelming majority of these immigrants have entered the United States, a considerable number have gone to certain parts of Latin America, and these parts are, therefore, quite different from the rest of the continent in their racial make-up (Map 2). In most instances this new colonization has been directed to regions which previously were of little value and were little developed. From São Paulo in Brazil, southward across the southern states, across Uruguay, and over the Humid Pampa of Argentina to the dry lands of Patagonia, there was a stretch of territory which was almost entirely devoid of signs of gold, and which was thinly populated by native peoples. Most of it would not grow sugar cane. Except for its strategic importance to the rival colonial empires of Spain and Portugal this section of South America was of little use to the earlier conquerors. Because Spain had established a center of settlement in Paraguay, and had utilized the Plata River as a sort of "back door" to Peru, and because Portuguese colonists had threatened to establish themselves permanently on the shores of the Plata, the Spaniards paid some attention to this strategic route. But the land bordering the Plata was only a remote part of the colonial empire of Spain and was used only for the grazing of cattle and mules.

This stretch of territory, therefore, was still little developed when the new European immigration began. The considerable population of the region today is composed mostly of the descendants of people who have come to South America during the last hundred years—Italians, Spaniards, Portuguese, Germans, Poles, and lesser numbers of many other nationalities, including Japanese.

In Latin America[5] the predominant racial composition of the population differs notably from one region to another. Five chief kinds of areas can be identified in terms of present-day racial character (Map 2): 1, areas of predominantly European population, mostly of recent origin; 2, areas of predominantly Indian population belonging to the Quechuan and Aymaran linguistic groups (Andean Indians); 3, areas of predominantly Indian population descended from other than the Quechuan and Aymaran groups; 4, areas with a mixed population with a large proportion of Negroes; and 5, areas with a mixed population in which the mestizo type is predominant (Indian and European).

[5] Latin America, as the term is used in this book, refers to the geographical area which lies to the south of continental United States. A very considerable part of the population is not Latin in origin or even in culture.

IV Diversity of the Physical Conditions of the Land

The fourth of the principal characteristics of Latin America is the fundamental physical diversity of the land[6] itself. The natural features of South and Middle America cannot be described without the use of superlatives. The Andes of western South America, which extend almost unbroken by low passes from the Caribbean to the Strait of Magellan, form the world's longest continuous mountain barrier. The Amazon, the third longest river of the world, is the one which is navigable for ocean-going steamers the farthest upstream. In the basin of the Amazon is the world's largest area of tropical forest. In Brazil, a little north of Rio de Janeiro, is the world's largest and richest supply of iron ore; in Northern Chile is the world's only natural source of nitrate. Returning again to Rio de Janeiro, we find this city located on the shores of what is commonly acclaimed as one of the world's finest natural harbors. The Humid Pampa of Argentina is probably the world's best endowed area—in terms of climate, water, soil, and surface—for the growing of grains and alfalfa, and the feeding of high-grade domestic animals. But when all these and many other superlative features and natural advantages are considered in the light of the needs of an Occidental commercial people, many of them seem to be poorly located, or to be combined poorly with other resources. The mountain barrier stifles the commerce which might develop between contrasted coasts. The great river sprawls across a continent through a vast forest filled with potential commodities of commerce, but neither the river nor the forest can be effectively utilized as long as the whole area remains one of very sparse population. The enormous body of rich iron ore is located in a continent notably lacking in coal. The nitrate deposits of Chile are separated from the seacoast by the steep slopes of an escarpment, and from the world's chief markets for nitrate by great distances of ocean. The magnificent harbor of Rio de Janeiro is hemmed in by the forbidding slopes of a highland which renders access to the interior difficult and costly. The ports which serve the productive Humid Pampa have been developed in spite of a complete lack of natural harbors; and the great city of Buenos Aires, which has arisen in response to the productivity of its hinterland, is one of the most poorly endowed metropolises in the world in terms of fuel and power resources.

[6] The word "land" is used throughout this book to refer in the broader sense to the whole physical environment—the surface features, the climates, the natural vegetation, the soils, the various natural resources—in short, the complex of natural features which forms the background of settlement.

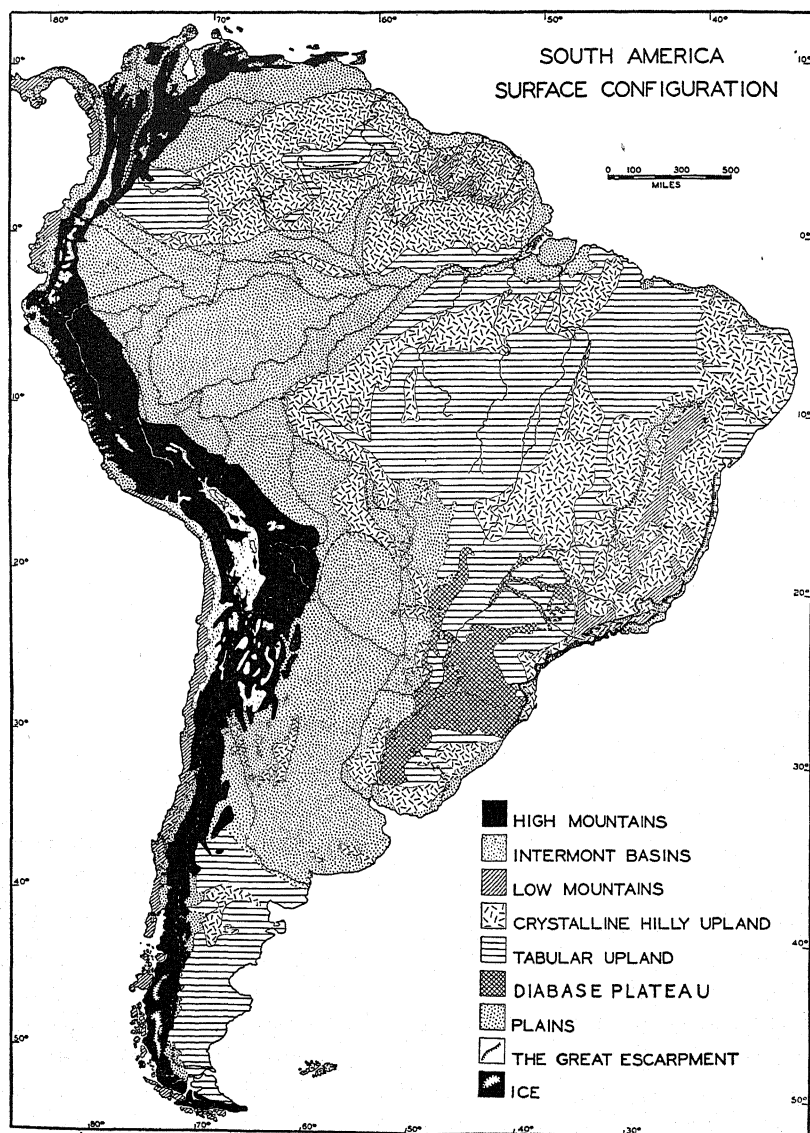
It is a fact of very great significance in the modern period that whereas North America possesses more than half of all the world's coal resources, South America has such meager supplies of this fuel that it can turn out only about 1 per cent of the world's production.

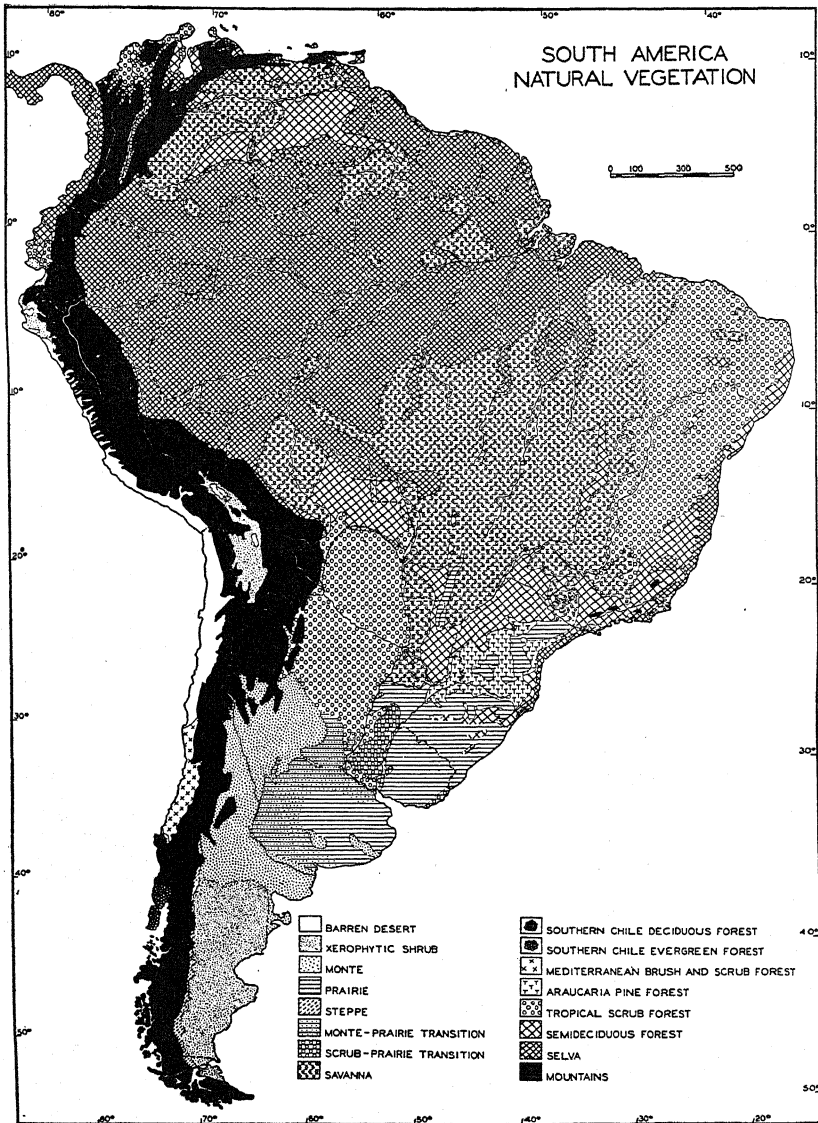
Superlatives, yes—but superlatives which are poorly combined in terms of the needs of modern industrial society.

Surface Features

Middle America, which includes Mexico, Central America, and the West Indies, forms a distinct break between North and South America (Maps 114, 118, 122, 124, 128). The geologic structures and surface forms of North America continue southward into Mexico a little south of latitude 20° N. where they are abruptly terminated by a northwest-southeast chain of towering volcanoes. Southern Mexico, Guatemala, and Honduras belong to a structural region which extends under the Caribbean eastward to Jamaica, southeastern Cuba, Hispaniola, Puerto Rico, and the Virgin Islands—a region of folded and faulted rocks with a generally east-west trend. This "Central American-Antillean" region is connected to South America by two chains of volcanic ridges and peaks: the West Indies; and the highlands of Salvador, southwestern Nicaragua, Costa Rica, Panamá, and western Colombia.

Three chief surface divisions form the major lineaments of the strangely assorted continent of South America (Map 6). These are similar to the divisions which, in happier relation to the climatic pattern and to the distribution of people, mark the surface of the continent of North America. On the west are the relatively young Andes; on the east are the Brazilian and Guiana highlands, geologically much older than the Andes, now partly covered by stratified rocks and lava flows, and in places surmounted by the massive stumps of ancient, worn-down mountains; and in the central portion of the continent lie the plains of the Orinoco, the Amazon, and the Paraguay-Paraná-Plata, filled with debris from the erosion of the highlands on either side.

For more than four thousand miles, from the shores of the Caribbean to the end of Tierra del Fuego, the Andes stand as a barrier between eastern and western South America. Compared with the western mountains of North America the Andes are narrower but considerably higher. Passes across the North American mountains can be found requiring a climb of only six or seven thousand feet; but most of the passes over the Andes, especially those which are located where there is need for a pass, are more

MAP 6

than ten thousand feet above sea level. The Andes are scarcely two hundred miles wide, except in Bolivia where the width is doubled. The peaks reach altitudes from eighteen thousand to nearly twenty-three thousand feet. Mt. Aconcagua (22,835 ft.) is the highest mountain in the Western Hemisphere.

MAP 7

Geologic structures in the Andes, as in Middle America, are complex. To describe these mountains as a continuous chain is quite incorrect. Actually they are made up of several structural units more or less closely joined. In general, the mountains are formed by folded and faulted structures, but in three distinct areas there are groups of active volcanoes.

These areas are in southern Colombia and Ecuador; in middle and southern Peru and along the border of Bolivia and Chile; and in the southern part of Middle Chile.

Since the Andes cross varied climatic zones, the processes of erosion and denudation which have sculptured the surface differ widely from place to place. The southern part of the Andes was heavily glaciated during the Ice Age, and even today the border between Argentina and Chile, just north of the Strait of Magellan, crosses an extensive mantle of permanent ice. Glaciers in this region still descend into the ocean at the heads of some of the fiords, or into the lakes on the eastern side of the range. North of latitude 39° S. the glaciers never emerged from the mountains and are now confined to higher and higher altitudes as one proceeds northward. Even on the equator, however, glaciation was once active, and small remnant glaciers still exist at the higher altitudes. In Bolivia and the northern parts of Chile and Argentina a dry belt crosses the cordilleras diagonally, and here the landforms typical of mountain deserts occur. From eastern Bolivia northward the rainfall increases in the mountain zone, and stream dissection becomes more and more active. Intermont basins at various altitudes are numerous in two chief sections: in Venezuela, Colombia, and Ecuador; and in Bolivia, Northern Chile, and Argentina. They are most common in areas of active volcanoes, or in the dry areas.

The pattern of surface features in South America east of the Andes, although bearing a broad similarity to the pattern of eastern North America, is quite different in its details. The greater part is made up of highlands, which extend with few interruptions from southern Colombia and Venezuela across Brazil to the northern bank of the Plata River, and which appear again in Patagonia. Throughout this vast extent of territory three chief surface elements are associated in varying patterns of arrangement. There is a base of ancient crystalline rocks which forms a hilly upland; above this in a few places the stumps of old, worn-down mountains have produced massive, rounded forms similar to those of the Southern Appalachians in the United States; and covering the crystalline base, especially in the interior, is a mantle of stratified rocks, now forming tabular plateaus with steeply scarped margins. In dry Patagonia the granites and gneisses of the crystalline base are relatively resistant to the processes of erosion and stand out prominently as hills; but in the rainy tropics such rocks are speedily decomposed and mantled with soil, forming hills of a distinctively rounded outline. The stratified formations include chiefly sandstones, which, especially in the rainy lands,

are so much more resistant than the crystalline rocks that they stand generally higher than the hilly upland throughout the Brazilian and Guiana highlands. Between the sandstone strata in southern Brazil, and in small patches throughout eastern South America, are sheets of dark-colored lava known as diabase. The diabase is especially resistant, and the edges of the lava sheets stand out prominently as cuestas. Some of the great waterfalls of South America occur where the rivers plunge over the edge of the diabase formations. The Paraná Plateau of southern Brazil is one of the world's largest accumulations built by successive flows of lava—similar in origin to the Columbia Plateau of Oregon and Washington, the Abyssinian Plateau of Africa, and the Deccan Plateau of India.

The arrangement of the plains of South America is very different from that of North America. In the first place they occupy a much smaller proportion of the continent. The Orinoco Plain is separated from the Amazon Plain by a belt of highlands. The Amazon Plain, which is wide along the eastern base of the Andes, narrows to only a ribbon of floodplain along the main stream east of Manaus. Southward along the Andes the plain of the Amazon is joined with the plain of the Paraguay-Paraná-Plata system, where the alluvium brought down by the rivers from both the Andes and the Brazilian highlands has covered all but a few of the more prominent features of the underlying rock surface. Unlike North America, there is no coastal plain along the Atlantic.

There is still another very significant difference between the patterns of the two continents. Because the highlands reach their greatest elevation in southeastern Brazil, back of Rio de Janeiro, where the highest summits are just under ten thousand feet above sea level, the larger rivers flow inland away from this region. The tributaries of the Paraná rise within a few miles of the coast in São Paulo, flowing thence northwest and then south; the tributaries of the São Francisco River, and those which eventually reach the Amazon, also flow toward the north, away from the southeastern coast. This divergence of the major streams deprives this part of the continent of any major natural focus of routes, such as the one which carries the traffic of the Middle West of the United States through the Mohawk and Hudson valleys to New York.

South America, on the whole, is not well provided with harbors, nor with navigable rivers placed where they can benefit the currents of commerce. The Paraná-Plata is navigable for ocean boats as far as Santa Fé, but to reach the artificial harbor at Buenos Aires dredges must work constantly to maintain a channel across the shallow mud banks of the Plata.

On the West Coast, with only a few exceptions, boats lie at anchor in the open ocean a mile or more offshore, and load or unload by means of lighters.

Climates

A great variety of climates are to be found in Latin America. As in all the continents there is a general symmetry in the arrangement of the climatic types on either side of the equator and with reference to the continental east and west coasts. The higher middle latitudes of the southern hemisphere contain a much smaller area of land than the equivalent latitudes of the northern hemisphere. South America, south of latitude 40°, projects a relatively narrow finger into the wide expanse of the southern ocean. Therefore the types of middle- and high-latitude climates associated with places distant from the moderating effect of the oceans are not found in the southern hemisphere. Compared with North America the southern part of the hemisphere has moderate climates —they are neither so cold in winter nor so hot in summer. Nowhere, even in southern South America, are the winters comparable in severity to those of Canada or northern United States. Even in Tierra del Fuego, more than 55° south of the equator, the temperatures average above 32° in the coldest month although in the warmest month they average below 50° (Maps 10, 108, and 110).[7]

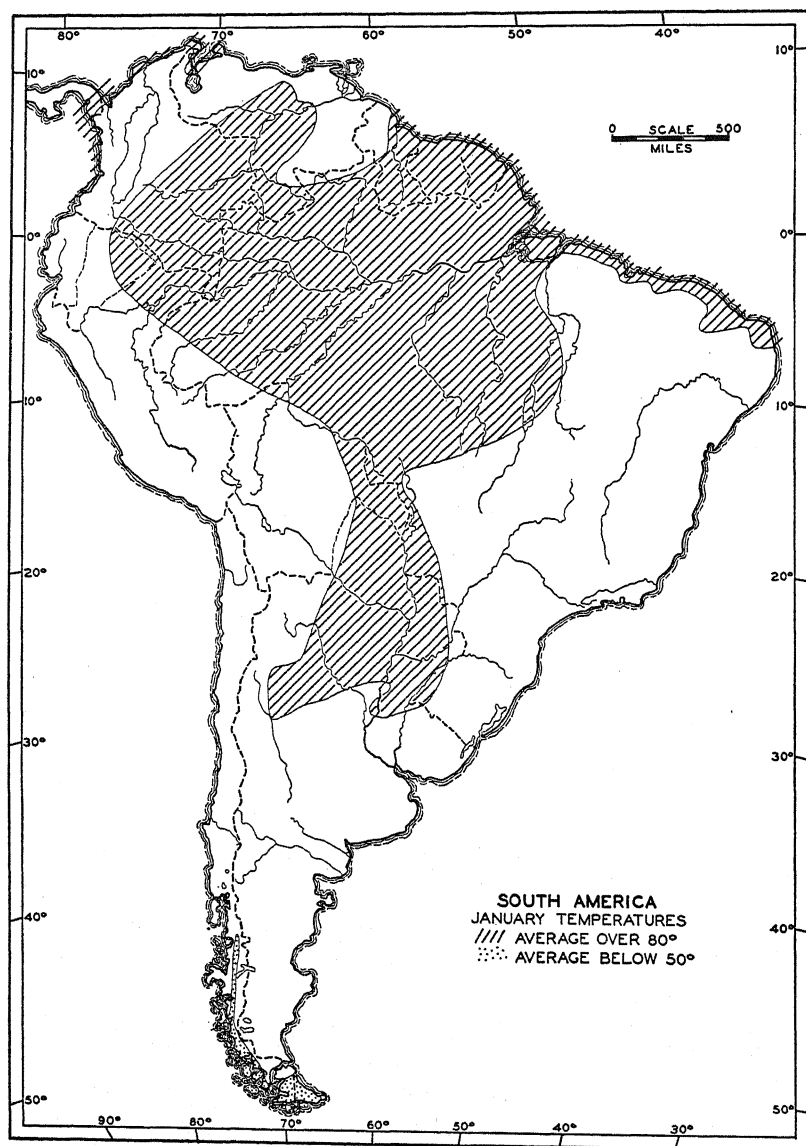
Along the western coast of both Americas the sequence of climatic types is similar on both sides of the equator. The cool, rainy climates of the higher middle latitudes on this coast are found in Southern Chile and in Southern Alaska and British Columbia. The similarity of the deeply fiorded coasts frequently swept by heavy storms which are found poleward of about latitude 45° on either continent is notable. The coast of Middle Chile, like coastal California, enjoys a Mediterranean type of climate, characterized by mild, rainy winters, and cool, dry summers; but because of the greater altitude of the Central Valley of Chile its summers are also cool, quite unlike the very hot summers of the much lower Central Valley of California. A little poleward of 30° on both continents, the rainfall diminishes until only drought-resistant, or *xerophytic*, types of vegetation can survive. Southern California and northwestern Mexico, like northern Chile, are deserts. The South American desert continues much farther toward the equator than does the dry west coast of Mexico. The former even reaches the northern side of the Gulf of Guayaquil in

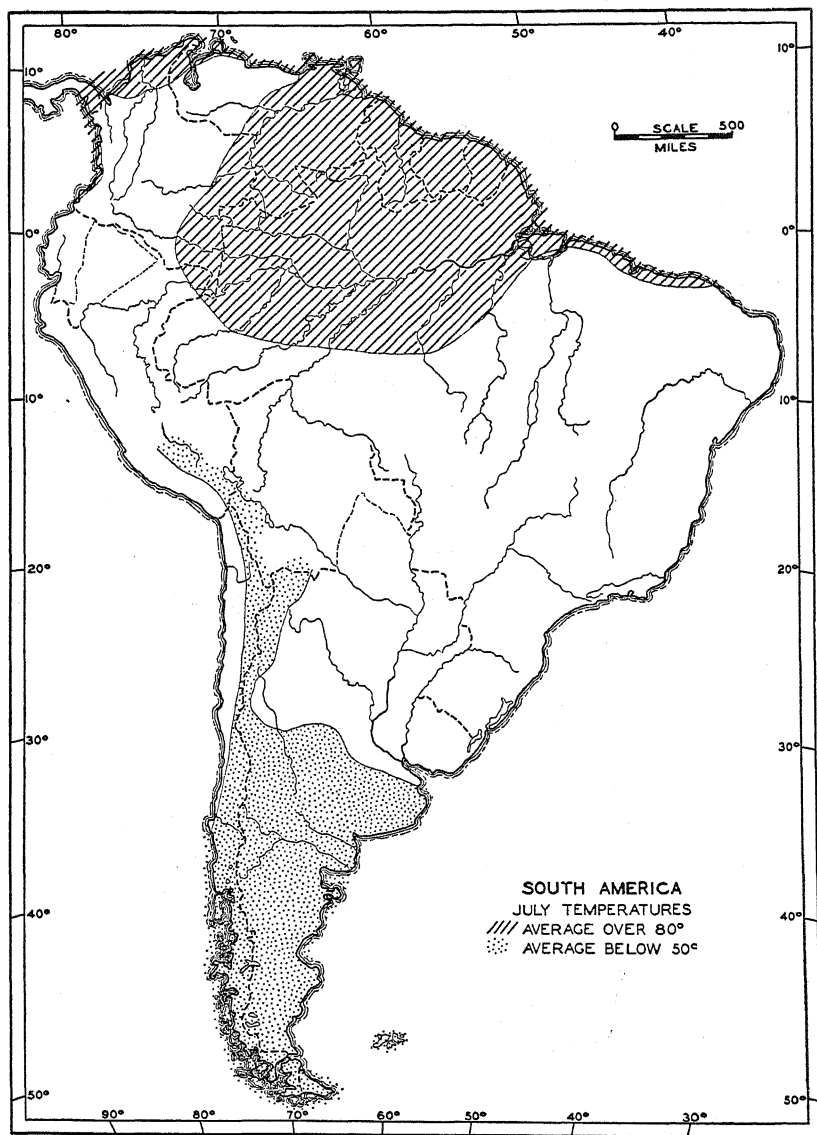
[7] Throughout this book the temperature is given in degrees Fahrenheit, and the rainfall in inches.

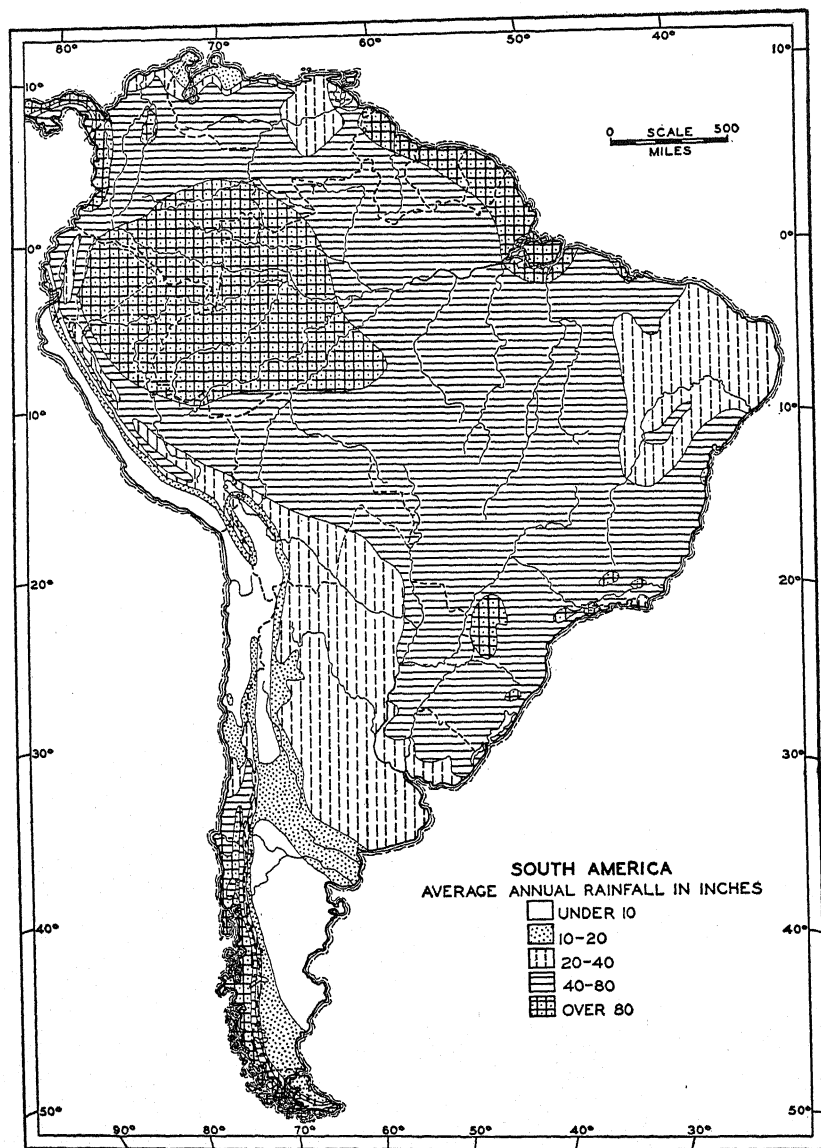
Ecuador, a few degrees from the equator, whereas the latter does not quite reach latitude 20° N. On the equatorward side of the dry lands, the west coast is moist, especially that part of the coast in Panamá, Colombia, and Ecuador which is bathed by the very warm waters of the Pacific Equatorial Counter Current.

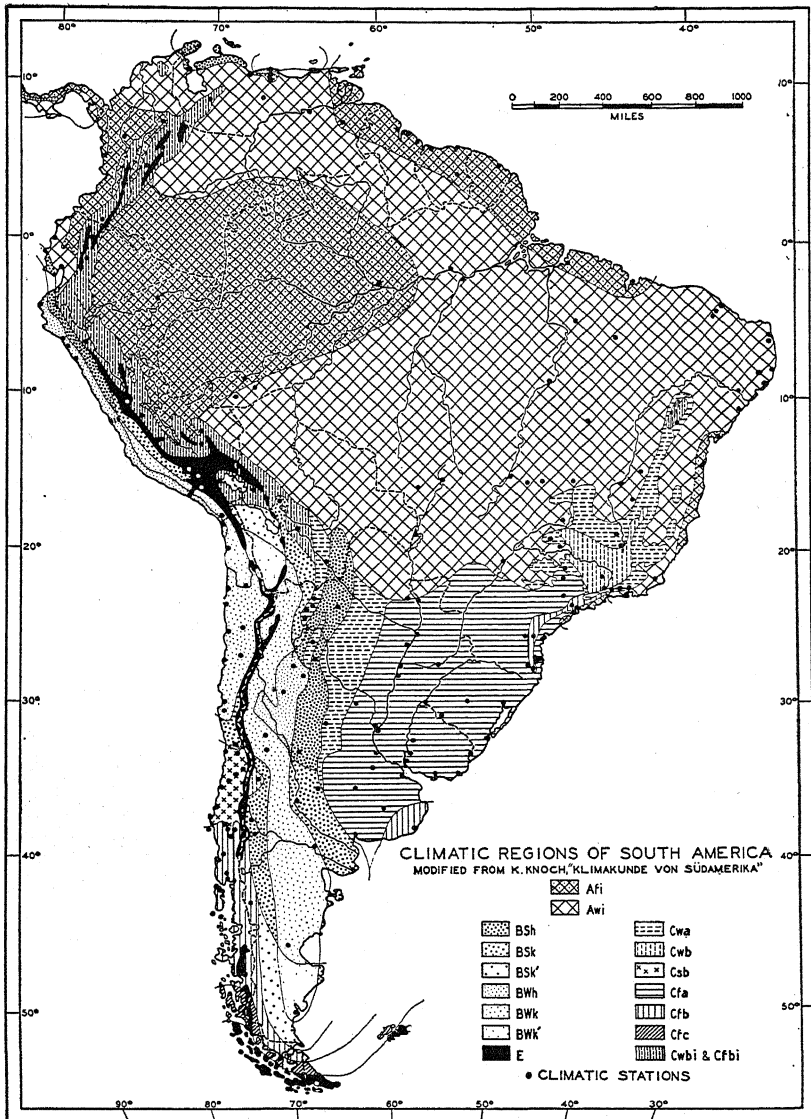
The eastern part of South America, on the other hand, can be compared with the equivalent latitudes of North America as regards climatic conditions only as far south as the latitude of Buenos Aires. The east coast is generally warm and rainy—with the single exception of the northeast of Brazil, where there is a region of very irregular rainfall and frequent drought. Places in eastern South America as far south as Buenos Aires are comparable to places at similar latitudes in eastern North America as regards average temperature and rainfall, but the temperatures of the South American stations are not so high in summer nor so low in winter as those of the North American stations which they otherwise resemble. Because of the higher altitudes of the interior of Brazil, relatively cool climates extend northward to the regions inland from Rio de Janeiro and São Paulo. The highland climates of southern Brazil are similar to those of the southern Appalachians of southeastern United States.

South of the latitude of Buenos Aires temperature and rainfall conditions differ greatly from those of northeastern United States at equivalent latitudes. The temperatures are relatively mild, being much lower in summer and higher in winter than in the United States north of New York. Between Bahía Blanca in Argentina and the Strait of Magellan, the desert extends to the east coast—a rare characteristic in any part of the world. Although this southern part of South America is crossed by many storms, and is noted for its blustery, changeable weather, it receives very little moisture. The ranges of temperature in South America reach a maximum in the interior of Argentina a little north of the latitude of Buenos Aires—where the difference between the average of the warmest and of the coldest months is about 30°. In North America, ranges increase toward the north, because the increasing distance from the sea supplements the increasing distance from the equator; but in South America these two factors are opposed, and the ranges of temperature diminish again south of Buenos Aires.

To state that three quarters of South America as well as most of Middle America lie within the tropics is to present a fact, but perhaps a misleading one. It is misleading because of the common tendency to assume the bad effects of tropical climate, and also the tendency to think of all tropical climates as more or less alike. There is just as great a

Map 8a

variety of climate within the tropical parts of the world as in the middle latitudes. An important distinction is to be made between the cool, cloudy desert of the Peruvian coast, for instance, and the hot, rainy conditions of Guiana or the hot, dry conditions along the Caribbean Coast of Venezuela. The highest temperatures in South America, as in other

Map 8b

continents, are not observed near the equator, as is popularly supposed, but rather on the border between middle and low latitudes during the summer months. The parts of South America which have temperatures averaging above 80° in the warmest month are found along the Caribbean and Guiana coasts, throughout the vast tropical area of the Amazon

MAP 9

Basin, and also over the plains of northern Argentina, most of which lie on the poleward side of the Tropic of Capricorn (Map 8a). The idea that the low latitudes are characterized by intense heat is based on the effect of the humidity encountered in certain parts of these lands, and also on the high *average* temperatures and the lack of any cool season. No such

MAP 10

extremes of hot weather are found in the equatorial regions as occur during a summer heat wave in the North American Corn Belt.

Climatic diversity is especially great in the Andes. In any mountain region the variations of exposure to the sunlight and to rain-bearing winds have the effect of producing very intricate patterns of local climate;

but there are also general altitude zones based chiefly on the decrease of temperature with increasing elevation. These high-altitude climates are in no way similar to the climates of the middle latitudes, for with increasing elevation above sea level the seasonal difference of temperature becomes less and less until it practically disappears (see the statistics for Quito in the Appendix).

In the low latitudes the greatest variety of vertical zones is to be found. The snow line rises to its highest altitude between 20° and 30° north and south of the equator, sagging slightly through the low latitudes. The snow line in Colombia is about 14,500 feet above sea level. On Mt. Orizaba in Mexico, 19° north, it is about 14,600 feet in altitude. On the dry west coast of Mexico and southern Peru or Northern Chile the snow line is considerably higher—in Northern Chile about 20,600 feet. In western Tierra del Fuego, on the other hand, permanent snow is encountered below 2,500 feet. The upper limit of trees and the upper limits of the various crops all follow this general pattern. In general, snow lines and tree lines come closer together in wet areas, and have the widest spread where the rainfall is relatively low.

The general distribution of climates according to the Köppen system is shown on Maps 10, 108, and 110.[8]

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[8] Maps 10, 108, and 110 present a revision of the climates of South America and Middle America as given in the various sections of the Köppen-Geiger handbook (17, 200, 201, and 202).

The Köppen system makes use of various letter symbols, each letter having an exact, quantitative definition. The letter combinations form climatic types. Those types which occur in Latin America are listed below, with brief qualitative characterizations:

Af, Am	Wet climate with no cool season and no really dry season
Aw, As	Wet climate with distinct dry seasons, but with no cool season
BW	Dry climates: BWh, hot deserts; BWk, cool deserts; BWk′, cool deserts with no hot season
BS	Semiarid climates: h, k, and k′, as above
Csb	Wet climate with mild, rainy winters and cool, dry summers
Cwa	Wet climate with mild, dry winters and hot, rainy summers
Cfa	Wet climate with mild winters, hot summers, and no dry season
Cfb	Wet climate with mild winters, cool summers, and no dry season
Cfc	Wet climate with mild winters, short, cool summers, and no dry season
Cfbi, Cwbi	High altitude climate of the tropics, characterized by extreme monotony of temperature
E	Continuously cool or cold climates, with no warm season

(For exact definitions and for a discussion of the distribution of these types in the world see P. E. James, *An Outline of Geography* [Ginn & Co., Boston, 1935]; or V. C. Finch and G. T. Trewartha, *Elements of Geography* [McGraw-Hill Book Co., New York, 1936].)

Natural Vegetation

The natural vegetation, in its broader patterns, is a faithful indicator of the prevailing climatic conditions. Where climatic stations are widely spaced, or where their records are short, the map of natural vegetation offers a reliable guide to climatic distribution. Throughout this book the location of the population with reference to the fundamental features of the land can be observed by comparison with the accompanying maps of surface features and natural vegetation, drawn on the same scale. The general distribution of vegetation is shown on a smaller scale for South America as a whole on Map 7.

On the general map of South America and on the larger-scale maps of parts of South and Middle America five major categories of natural vegetation are recognized, four of them with several subdivisions. The first of these major categories is described as *Desert Vegetation*. The Latin-American dry lands are mostly covered with *xerophytic shrub*, a scattered growth of low, drought-resistant plants. An impoverished scrub forest, however, actually invades the dry lands both in Argentina and in certain parts of Mexico. This formation of low, dwarf trees is known as *monte*. In northern Chile and in the coastal region of Peru there are stretches of absolutely barren land, covered with plants only after the rare occurrence of a rain, a heavy dew, or a fog. Generally speaking, the distinguishing feature of the so-called "desert-vegetation" is the absence of a complete cover over the surface.

The areas of desert in Latin America are bordered by both grasslands and scrub forests. The *Grasslands*, the second major category of vegetation, includes three types. In cool regions, as the effective moisture increases, the xerophytic shrub gives way to a short grass *steppe*, which completely covers the ground with a sod. The steppe is restricted in Latin America, however, to narrow patches along the eastern front of the Andes in Patagonia and, possibly, to some of the wetter spots of the dry lands of Northern Mexico. In places where the climate is distinctly humid the short grasses are crowded out by tall grasses, or *prairie*. This grassland formation, which covers the Argentine Humid Pampa, Uruguay, and part of southern Brazil, is entirely lacking in trees except along the streams. The native tall grasses of Argentina differ from those of the North American prairies in that they are bunch grasses and each plant stands separately without forming a sod. In addition to steppes and prairies the grasslands also include the tropical *savannas*—a vegetation type which covers vast areas of Latin America, especially in the

interior of Brazil. There are two kinds of savannas: wet savannas which occur in areas subject to inundation and which are commonly marked by tall rank grasses and by an absence of trees; and dry savannas which occur in areas that are well drained and subject to droughts and which are commonly so mixed with scattered scrub trees that they are difficult to distinguish from tropical scrub forests. In both wet and dry savannas, as in the prairies, the banks of the streams are usually covered with a dense ribbon of forest, known as a *galeria*—literally a "tunnel forest," since the narrower streams flow beneath an arch of foliage.

On the cool side of the deserts on the continental west coasts, where the climate is distinguished by its winter rains and summer droughts, a very distinctive type of vegetation is found. This is named after the chief and best-known area of such climate—the *Mediterranean Evergreen Scrub Forest and Brush.* In Latin America this forest type occurs in Middle Chile, where the landscape bears certain striking similarities to the landscape of the coast of Southern California. The trees and bushes are broadleaf and evergreen.

The fourth major category of vegetation is made up of the *Tropical Forests* of which there are three types. On the border of the deserts, commonly associated with semiarid or subhumid climates, is the *tropical scrub forest.* This is a formation composed of low scrub trees which are broadleaved and deciduous, since they drop their leaves during the dry season. In some cases the trees grow in thickets, interspersed with grassy openings; in others they are scattered over the land with savanna grasses covering the forest floor. In either case the separation of the dry savanna from the tropical scrub forest is not easy, since both formations are composed of scrub trees and tall grasses. The *tropical semi-deciduous forest* is composed of large broadleaf trees including a mixture of evergreen and deciduous species. The latter drop their leaves during the dry season. In some places this forest may be so dense that it can be called a *jungle*. The *tropical rain forest*, or *selva*, is the world's most luxuriant forest type, growing only where rainfall is heavy and temperature never low. This forest is broadleaf and evergreen. Unlike the midlatitude forests, the selva comprises a very great variety of species, some of which grow to great heights and others of which are smaller and grow in the shade of the larger trees. This type of forest is not a jungle, for there is little underbrush on its shaded floor. Only where the light can reach the ground, as along stream banks, on steep mountain slopes, or where clearings have been made and abandoned, is there a dense growth of smaller plants and lianas. The term "jungle" must be reserved for

spots of tangled underbrush, whether in the selva or the semideciduous forest. Tropical forests are widespread in Latin America.

The fifth category of vegetation is the *Midlatitude Mixed Forest*, a type which is found in Latin America only in southern Brazil, southern Chile, and in the higher altitudes of some of the mountain regions. In southern Brazil the *Araucaria forest* is composed of mixed pine and broadleaf species, like the pine-oak forests of the Southern Appalachians. In southern Chile there is the *Antarctic beech forest*, composed of a variety of broadleaf species which are mostly deciduous. The very rainy western slopes of the Andes in southern Chile are covered with a dense *midlatitude rain forest*, composed of broadleaf, evergreen species, a forest which differs from the tropical rain forest in the relatively small number of kinds of trees and in the dense growth of underbrush.

On most of the maps no attempt is made to indicate the distribution of the various types of vegetation in mountain areas. Very intricate patterns of distribution, and many different types of vegetation occur in mountains, and only in a few places have these been carefully studied.[9]

THE RELATION OF PEOPLE TO THE LAND

Four principal characteristics, then, summarize the general conditions of people and land in Latin America. As we have seen, these four characteristics are: (1) a relatively small population; (2) a population of isolated clusters separated by very thinly settled areas; (3) a racial and cultural diversity of the Latin-American people; and (4) a great diversity in the physical conditions of the land. This brings us, next, to a formulation of the chief problems with which we are confronted in the attempt to interpret the present distribution of people.

Habitability

The first of these problems has to do with the habitability or productivity of the land. How many people can be supported in a given territory? The population capacity of an area would be a relatively simple matter to estimate if it could be measured in terms of the qualities of the land alone: that is, in terms of the proportion of the surface with slopes of a certain degree of steepness; of the regularity and dependability of

[9] In South America these five major categories of vegetation occupy the following proportions of the total area: Desert Vegetation, 11 per cent; Grasslands, 29 per cent; Mediterranean Evergreen Scrub Forest and Brush, 1 per cent; Tropical Forest, 44 per cent; Midlatitude Mixed Forest, 1 per cent. Various kinds of mountain vegetation occupy the remaining 14 per cent. From James, *op. cit.*

certain favorable types of weather; of the productivity and arrangement of different soils; of the quantity and accessibility of mineral and power resources; or of the existence of natural routes of travel. To be sure, only in certain parts of Latin America are these physical qualities of the land known in sufficient detail to provide an effective guide to any kind of settlement; but to remedy this lack of information in specific areas in which there are specific problems of human use requires only the organization of a field survey based on methods of land inventory which geographers have now developed beyond the experimental stage. Problems of habitability, however, are not so simple as this.

The fact is that the significance of the various items of the land depends, not on their inherent qualities, but on the importance attached to them by a particular group of people at a particular period of time. Differences in technical skill, contrasts in fundamental objectives and attitudes, variations in the general economic order—all these things produce changes in the relation of people to the land. Furthermore, certain aspects of the land, especially the vegetation and the soil, may be profoundly altered as a result of human activities.

There is, after all, only one basic compulsion in the relations of man to the land—if a group of people is to remain for a long time in any area, some kind of workable connection must be formed with the earth resources. Not even city people are free from this necessity. From the land must come the fundamental needs of human life—food, clothing, and shelter; and from the land, also, must come the material means by which a human community can raise its standard of living above the minimum essentials of existence. To the problem of making a living, however, or of creating wealth from the resources of the earth, the earth itself remains essentially passive and indifferent. Certain natural limits to human settlement are presented, such as the limits determined by land and water, or by slopes too steep, or by soils too sterile, or by climatic conditions too severe or uncertain. But these limitations are generally flexible ones. As population spreads over the land the settlers are confronted by a series of specific problems in which one element is the quality of the earth resources, but in which the active element is the quality of the human resources. The particular kind of connection which is attempted is not so much prompted by the latent earth resources as by the inherited traditions and way of living of the inhabitants. Only in terms of human cultures can we evaluate the habitability of regions. Unfortunately these things are not so easily measured as is the degree of slope or the fertility of soil; and in the present state of our techniques

for the study of society—whether in Latin America or elsewhere—the attempt to interpret man's relation to the land will raise more problems than can be answered. It is well, however, to present the problems so that our attack on them can be brought to a better focus.

Struggle to Establish Order

When we attempt to formulate some of the social, political, and economic processes which have combined to produce the present population of Latin America we come again and again to various aspects of one central theme. We find that in one way or another Latin-American life must be understood as a struggle to establish order among diverse and discordant elements. We find, in the same region of settlement, groups of people mixed but not blended, whose traditional ways of living, whose technical abilities, whose fundamental attitudes are not only different but are so inharmonious that none can really prosper in the presence of the others. For example, there are certain nations which, since their independence, have been torn by the struggle for central control between two minorities: the large landowners, anxious only to be free from government interference; and the bureaucracy, composed of educated liberals whose chief interest is in politics. There are other regions where the speculative exploitation of resources competes in the same area with a group of peasant proprietors seeking to establish themselves permanently on their own small farms. There are areas where one part of the population inherits a communal tradition of land tenure and another part inherits the tradition of the private estate. These and many other discordant elements produce such divergent attitudes toward the land and its use that harmony can be achieved only through the subjugation of one element by the other.

This struggle toward order among diverse elements is a process which can be observed in any community. Order is, of course, a relative term; it suggests that a substantial majority of the people are so harmonious in their basic traditions, skills, and objectives that one form of settlement or one co-ordinated group of connections between man and the land can be established and maintained. Methods of reaching such order are various. Some communities are brought together through service to an ideal, great enough and universal enough to command the allegiance of diverse individuals. Other communities achieve order through the struggle with a common problem, such as the conquest of a pioneer land, or defense against a foreign enemy. Still others are given an apparent

order through the lulling effects of widespread prosperity. Different methods failing, many communities in past periods, and again in modern times, have enforced order through the operation of a strong central authority. In Latin America all these methods, and many others, have been tried with varying success; but in a number of regions of settlement and in many of the independent states built around them, the establishment of a coherent society has been retarded or thwarted.

Why should the Latin-American countries find so much difficulty in reaching a solution of this problem? We do not find among these people any scarcity of able leaders, any lack of outstanding political philosophers, any dearth of poets or men of letters, or any absence of courage and resourcefulness among the people. But we do find that Latin-American society is troubled by perhaps a greater degree of original diversity than most of the other Occidental peoples of the world; and we also find that these basic racial and cultural diversities have been increased through the unbalanced social and economic development of certain regions against a background which remains economically medieval. The problems that have to be faced in the establishment of order in Latin America are not simple ones.

Impact of Diverse Racial and Cultural Elements

Whether the original racial and cultural diversity of the elements which have entered into Latin-American society is to be described as an advantage or a disadvantage is a disputed question. The almost complete contrast in attitudes and objectives which exists between, for example, the descendants of the Incas and those of the Spanish conquerors is so great that even to this day the two have established only a minimum of co-ordination and harmony within the territory they occupy together. The impacts of pagan and Catholic, of communal farmers who use the same word for "duty to the state" as for "happiness" and the extremely individualistic Spaniards who have a strong sense of property rights—these created internal conflicts which have yet to be resolved. Similarly in Mexico, although an attack on these fundamental diversities has been started, the lack of internal coherence is still far from solved. For these states diversity cannot yet be accounted a benefit. Diversity in Colombia, however, has now become a source of strength.

In no part of the world are studies of race mixture by impartial observers more needed than in Latin America, especially in the predominantly Indian and mestizo countries, and in Brazil. Many observers

of race mixture insist that the mestizos do not constitute a new race of unified characteristics, but rather a mixture of ingredients so fundamentally different that they can never blend. On the other hand, there are those who see in this mixture of Indian and European the basis of a new race and a new civilization. There is a distinct movement in the Indian countries looking toward a "rediscovery" of the artistic and technical skills of the Indians, a movement tending to discredit the Spanish contribution. In Brazil the Negro mixture has produced every possible shade of color from very black to pure white, with all sorts of intermediate types including individuals, for instance, with blonde, kinky hair. Among many of the pure white families of Brazil there is a considerable amount of race prejudice; but not a few of the Brazilian writers extol the virtues of race mixture in producing a new fusion of racial and cultural elements—a new civilization. Among all these diversities, however, the struggle to establish order, the struggle to assimilate, to create or maintain a coherent nation, become problems of vital significance, and the changing character of these struggles conditions the relation of people to the land.

Social Diversities within the Feudal Society

Racial diversity, however, is not the only source of disharmony within Latin-American society. There are social and economic cleavages which divide communities into sharply contrasted classes. Some of these class distinctions are inherent in the society of traditional Latin America; but in the modern period the arrival of the urban industrial way of living has developed a new kind of difference separating the people of the larger cities from the people of the rural districts.

In traditional Latin America the economic and social life is dominated by the large estate. For want of a better term we shall describe this kind of society as *feudal*, although this implies none of the specific characteristics of the European feudal political system. Prestige and security in a feudal society are gained first through the ownership of a large tract of land. A very minor proportion of the total population forms the landed aristocracy, and is enabled to live in comfort and security and with a relatively high standard because of the large area from which income is derived and because of the relatively low cost of labor. When land is no longer available, prestige, if not security, can be gained by finding a position in the government service, or by winning a commission in the army, or by entering the priesthood. But these various forms of life are

open only to the fortunate minority: the vast majority of the members of a feudal society are landless workers—peons, sharecroppers, tenants, or others. Usually they are permitted to make use of small areas for the production of their own food, and for the materials necessary for clothing and shelter; they repay the owner by providing him with wage laborers, or by paying him rent for the use of land for commercial crops. This is the Latin America of the semi-independent large landowner, who wishes above all to be left alone by all government authority; it is also the Latin America of political insecurity, in which first one group and then another plots to overthrow those who are in power, rarely because of genuine differences of ideology, usually because of the desire for the rich rewards of office-holding. This is the Latin America which verges on internal chaos to such an extent that it can be held together only by the successful operation of military dictatorship. This is the Latin America in which the army is the most powerful force in political life.

Impact of the Industrial Society

The history of the Occidental world during the last few centuries has been chiefly involved with the impact of the new *industrial society* and the older *feudal society*. Beginning in Western Europe the new way of living, coupled with enormously increased productivity in all forms of economic activity through the use of controlled inanimate power, has gradually transformed whole sections of Europe and America. In some instances the transformation has taken place by gradual evolution; in not a few instances it has been accompanied by violence and warfare, both civil and international. The rapid increase in the need for raw materials of all kinds has produced the present intense rivalry for the control of the productive regions, especially of the sources of power. The English-speaking peoples, who were the first to adopt the new way of living, were able to gain control of about 75 per cent of the developed power resources of the world; and the challenge to this control lies behind the present international turmoil. In Latin America, the impact of the industrial society with the traditional feudal society is now going on. Where the industrial way of living has become established, a new and still more profound line of cleavage has been formed across all the previous diversities of Latin-American society.

The fundamental characteristics of the industrial society should be reviewed briefly. The use of controlled inanimate power changes the emphasis from production by cheap labor to production by machines—

or, in terms of economics, capital investment assumes a position of preponderant importance, and the owners of capital rather than the owners of land assume places of the highest prestige and political power. Production is enormously increased, not only total production, but also per capita production. This leads to specialization and exchange, and hence to interdependence over wide areas. Trade is transformed from a small-scale exchange of luxury goods or specialties to a large-scale exchange of staples, and as a result communities are no longer supported by the products of the territories immediately surrounding them, but from a wide variety of producing areas, most of them beyond the control of the community which absorbs the products. With life organized on such a pattern society reaches a much higher standard of material comfort than any previous society has been able to reach; but this standard can be maintained only if a nation accepts the fact of wide geographical interdependence, turns away from provincial isolation, and co-operates with other nations in the maintenance of a stable financial structure of money and credits.

The industrial society brings profound changes in the details of human life. Prestige, we repeat, is to be gained through the ownership of capital which brings power, rather than through the ownership of land which brings security. Life becomes more speculative, less certain, but with rewards for the successful which are in a material way far beyond anything the world has offered before. There comes a notable change in the time concepts. With the increased tempo of life the vague concepts of feudal society, such as *por la mañana*, *por la tarde*, must be given up for more precise concepts, such as 9 : 45 A.M. or 3 : 10 P.M. Behavior of all sorts becomes more standardized. The picturesqueness of provincial costumes disappears under a uniform cover of blue denim overalls; people from Patagonia to Labrador watch the antics of Popeye the Sailor; local differences in manners and customs are modified by the impact of the new patterns of life. In the big cosmopolitan centers of Latin America life follows the same routine as in North American or European cities —this uniformity is apparent in styles of architecture, styles of dress, forms of work and recreation—in short, the whole aspect of life is changed from its variegated feudal base to a uniformity repeated in all the Occidental urban centers.

These changes affect the distribution of people. As long as coal remains the chief source of power, manufacturing industry is carried on at the lowest cost in large concentrated units. People gather together in great cities—cities greater than any that the world ever knew before, cities

of more than a million inhabitants. Although the use of electric power may have the effect of spreading manufacturing industry over a wider area, thus transforming the life in smaller towns and villages, the large concentrations of city people still perform more efficiently the urban functions of commerce and administration. These cities are still dependent on the productivity of the land for their support, but the land base has been greatly extended; and as a result the means of transportation which tie the cities together must be greatly elaborated.

The urban-industrial way of living has come to Latin America from outside, not by slow evolution from the earlier feudal base. In parts of Europe and in Anglo-America where the cities and the urban life developed out of the rural background there is a certain normal relationship between the size of the city and the productivity of its rural hinterland. When through the artificial erection of political boundaries and barriers a city like Vienna is deprived of the hinterland which it once served, the financial and economic life of the city is disrupted. When politically independent states attempt to return to isolation and self-sufficiency, the urban-industrial society falls into chaos. All these adjustments between cities and their territories and all these disruptions of the earlier adjustments can be witnessed in Europe today. In Latin America one finds cities which have become industrial and commercial centers with an industrial way of living, but which bear little relationship in size or in function to the rural districts back of them. The contrast between the cities and the rural districts is enormous: the average tourist who journeys by boat or airplane from one city to another scarcely catches a glimpse of the Latin America which is traditional, and which is still dominant in terms of area and numbers of people.

Urban-industrial growth has appeared at various places in Latin America. The largest development of this cosmopolitan life centers in Buenos Aires, São Paulo, Rio de Janeiro, and Mexico City—all cities of more than a million people, all thoroughly modern metropolises, with a way of living entirely familiar to metropolitan dwellers throughout the Occidental world. Smaller industrial centers have appeared in the cities of Middle Chile, notably Santiago and Valparaiso. Lima, in Peru, has been transformed from the primary settlement center of the Spanish colonial conquest of western South America into a modern cosmopolitan commercial and manufacturing city. Medellín, in Colombia, is another growing center of industrial life. Still the industrial productivity of all Latin America put together remains very small in comparison with that of Western Europe or Eastern United States.

A GEOGRAPHY OF MAN

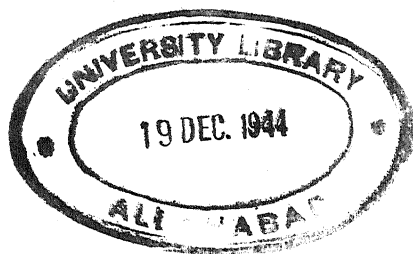
The struggle to establish order among these diverse elements is a basic theme which endows the present-day arrangement of people in Latin America with meaning. In each independent state, in each separate cluster of people, this struggle takes a somewhat different form and has reached somewhat different stages. As a result, the significance of the elements of the land—the potential value of the natural resources—differs from place to place and from time to time. In extreme cases we find two or more diverse groups mixed but not blended in the same area of concentrated settlement, each group motivated by different attitudes and objectives and consequently each reacting differently to the variegated background of the land. In a few instances we are encouraged by what seems to be a real advance against the forces of disunity. When we examine the map of people in detail in the light of this theme we can no longer see it only as a pattern of apparently uniform dots irregularly clustered—we see each cluster as possessing a distinct individuality, as composed of people who have made a separate and distinctive contribution, even if only a negative one, to the struggle toward the development of a coherent society.

Such a study of the map of people also transforms it, in our minds, from a static thing to a stage in a process which moves forward out of the past and is projected into the future. The phases of the struggle, during the passage of four centuries, result in changing relations between the people and the land, and consequently in frequent shifts of the population. Many parts of Latin America, considered over the course of history, have notably shifting patterns of people; and in those areas which are stable—such as the predominantly Indian communities of Mexico, Guatemala, and the Andean highlands of southern Colombia, Ecuador, Peru, and Bolivia—the impact of the European has been relatively slight. On the other hand, some of the most important areas of Latin America, in terms of commercial productivity in the modern world, were, less than a century ago, only sparsely inhabited.

The destructive exploitation of resources takes on new meaning with the advent of the industrial society. Small-scale exploitation widely scattered over the continent characterized the feudal society: large-scale exploitation in concentrated areas is the mode of action of the industrial society. A resource today to be of value in the industrial world must be large enough to support a large-scale development; otherwise the cost of production is too high. Yet the demand for raw materials is unequalled

in all the previous history of the world. Those places where superlative resources are to be found become potential centers of rapid population increase and economic development. But permanence and stability, in a world itself undergoing a major transformation, are rare. Men still search frantically for the accumulated wealth of El Dorado, and, as it eludes them in one place, they move on to other places. Is the growth of the new industrial cities likely to bring stability and permanence, or only a new form of migration, a new and still more chaotic form of exploitation, to be followed by a new decline?

PART I

SPANISH SOUTH AMERICA

2

ESTADOS UNIDOS DE VENEZUELA

Total area, 352,170 square miles

Total population, 3,491,159

Capital city, Caracas; population, 203,342

Trade per capita:

Imports: $30.63
Exports: $78.29

Unit of currency, bolivar ($.326, gold content value)

Major commercial products in order of value:

petroleum	hides and skins
coffee	fruits and vegetables
gold	pearls
cacao	

Railroad mileage, 539

(The above statistics are for the year 1938.)

2

VENEZUELA

VENEZUELA cradled both Bolívar and Gómez. Simón Bolívar, the liberator of northern South America from Spanish rule, the shrewd observer of the political abilities of his countrymen, came from an aristocratic family in Caracas. He was mostly white, but had one Indian ancestor. In his complex personality were to be seen the most remarkable extremes. He was an idealist, ready, after the death of his young wife, to leave his traditional place on a large estate in the valley of Aragua and to undertake the dangerous business of revolution. His ideal was liberty—the personal liberty of his people from the oppression of unsympathetic European rulers. Yet he was realist enough to become a most successful leader of armies, and, along with his dream of freedom and peace for a United States of all Spanish South America, he could harbor enough implacable hatred to order the execution of one group of more than eight hundred Spanish prisoners.

Bolívar's ideal of a united South America was shattered by revolt. In 1830 his own chief lieutenant in the War of Independence declared Venezuela to be free from Greater Colombia. Bolívar, in despair, said, "Our America will fall into the hands of vulgar tyrants; only an able despotism can rule America." This was more than a hundred years ago; but the prophecy has been fulfilled quite literally during the succeeding years.

Between 1830 and 1935 Venezuela had more than a dozen rulers, but three "able despots" stand out above all the others. Páez was the first

of these, the half-Indian, mestizo peon, who declared the independence of Venezuela in 1830. The second was Guzmán Blanco, who first came into office in 1870. From 1909 to 1935, it was Gómez. Under each of these despots Venezuela was run like a vast private estate for the benefit of the owner; but the result was the establishment of order among the various factions and a consequent increase of material prosperity. In the intervals between, the country was ravaged by the conflict of warring elements no one of which was strong enough to beat the others to submission—these were periods of destruction and loss.

Juan Vicente Gómez was not descended from the aristocracy. He was the illegitimate son of an Indian mother and a Spanish father who lived in the high Andean country along the Colombian-Venezuelan border. He was a man of tremendous ambitions, a ruthless fighter, one who ruled his country with an iron hand. He completely eradicated the last vestiges of civil liberty, but with the aid of oil brought Venezuela through the difficult period after 1929 in a better financial condition than any other Latin-American country. When he died in 1935, mobs tore his palace to bits. He was one of the best of Venezuela's able despots.

THE VENEZUELANS

Bolívar and Gómez dramatize the contrasts which exist among the people of Venezuela and some of the difficulties involved in establishing order among such diverse elements. The ingredients which have entered into the human mixture in this country include Europeans, Indians, and Negroes. If we consider only those individuals who are strictly European, with no Indian or Negro ancestry, their proportion in the total population is probably less than 2 per cent; but if we consider the larger number who, like Bolívar, are predominantly European, the figure can perhaps be raised to 10 per cent. Pure Indians are also difficult to find, and may be estimated as between 2 and 11 per cent. Pure Negroes make up about 5 per cent, with another 4 per cent of mulattoes and zambos. From 70 to 90 per cent of the Venezuelans, however, are mestizos—persons of mixed European and Indian parentage.

Racial percentages are not uniform throughout Venezuela. Europeans are concentrated in the larger towns and cities—in Caracas, Maracaibo, or Valencia. Pure Indians, on the other hand, survive only in the more remote places—in the Guiana Highlands south of the Orinoco River or in the forests west of Lake Maracaibo. The Negro mixture is greatest along the Caribbean Coast, in such ports as La Guaira and Puerto Cabello.

Even among the mestizos there is a notable difference between the people of the highlands and those of the lowlands. To understand these differences we must go back to the early days of the Spanish conquest.

The Indians and the European Conquest

In 1500 Venezuela was occupied by scattered tribes of Caribs and Arawaks (Map 4). These people lived along the northern coast of South America and on some of the islands of the Caribbean. They were primarily hunters, fishers, and migratory cultivators. Although people of the same racial stock apparently were occupying both highlands and lowlands at the time of the conquest by Europeans, the highland tribes were superior in every way to those of the lowlands. Perhaps the cooler air of the mountains was more conducive to active life; but there were many other factors which may have been more important, such as better water, better diet, steep slopes on which to keep the muscles hard, and a relative freedom from the mosquitoes and other insects of the lowlands. The highland Indians were tall, active, and warlike; the tribes of the lowlands, such as those on the Orinoco delta or the shores of Lake Maracaibo, where the chief food was fish, were shorter, were subject to rickets, had pot bellies and bad teeth, and were slow-witted and peaceful.

Contact between the Spaniards and the Indians began along the coast of Venezuela during the first part of the sixteenth century. The first European settlement on the continent of South America which has survived to the present time was established at Cumaná (Map 11), in 1523. Four years later another colony was planted at the base of the Paraguaná Peninsula at Coro. From these two bases exploring parties pushed inland. West of Coro the Spaniards entered the Maracaibo Lowland and, coming upon Indian villages which were built on piles in the shallow waters of the lake, they named the country "Little Venice," or Venezuela.

The territory these first Spanish explorers penetrated was less attractive than Mexico because of the sparseness of the Indian population and the absence of any accumulation of treasure. Nevertheless the Spaniards pressed inland searching for gold, and in the period after 1538 they did actually discover many places where the stream gravels yielded the precious metal. The placer mines of the valley in which Caracas was later founded, as well as those of many scattered localities throughout the highlands, were actively worked with gangs of Indian slaves, and for a time the Venezuelan mines seemed to promise great wealth. But none of the sources of gold discovered at that time proved to be better than low-grade deposits, and the gold miners were forced to turn to agriculture.

More than twenty years elapsed after the settlements at Cumaná and Coro before the first permanent town was established on the highlands, although during that period the whole highland region had been tramped over and many of the valley bottoms had been dug up in the search for gold-bearing gravels. In 1555 the town of Valencia was founded in the intermont basin which has since become the leading agricultural district of the country (Map 11). The good farming land was quickly partitioned into large estates which were divided among the Spanish officers; and on these estates the Indians, Christianized and enslaved, were set to work for their new masters. Barquisimeto was also established about this time in the midst of another farming district to the west of Valencia, and in 1567 Caracas was laid out. Spaniards who had invaded the country wh ch is now Colombia and who had founded Bogotá turned again toward the north and established San Cristóbal and Mérida in the mountains south of Lake Maracaibo.

After these first highland settlements had been made, more than a century elapsed before the Spanish occupation of other parts of Venezuela began. To be sure, some of the savanna-covered plains of the Orinoco in the neighborhood of Valencia were utilized for the grazing of cattle and even for agriculture; but the penetration of the more remote parts of the country was delayed until late in the seventeenth century. Barcelona was not founded until 1671 and Calabozo till 1695. Maturín was founded in 1710 and Angostura, now called Ciudad Bolívar, in 1764.

Meanwhile, the mixture of races proceeded rapidly. The Spaniards did not generally bring their womenfolk with them to America, but took wives from among the Indians they conquered. While great numbers of the native peoples died from the epidemics of measles and smallpox the mestizo children showed a greater degree of immunity to these diseases than their Indian ancestors. Nevertheless, the landowners soon found themselves faced with a shortage of agricultural laborers. Where sugar cane was planted, Negro slaves were introduced to perform the hard work necessary for the harvesting and grinding of the cane. Since intermarriage was unrestricted either by law or by custom, the population of the districts where sugar cane was grown became considerably darker in complexion than that of the rest of the country.

Present Population

The population of Venezuela has been increasing only very slowly. At the beginning of the nineteenth century Alexander von Humboldt, the famous German geographer, estimated the number of Venezuelans to be

about 1,000,000. In 1920 another estimate, based on a wide knowledge of the country but not on an actual census, placed the figure at 2,400,000 —not a very great increase in more than a century. Since 1920, however, a more rapid rate of growth has brought the estimated population to 3,500,000.

Although the net increase has been low, there have been significant shifts of population within the country. Especially in the last two decades the larger cities have had a vigorous growth. Caracas is now a city of more than 200,000, and Maracaibo a city of a little over 100,000. Other parts of the country, on the other hand, have declined in population, and the signs of abandonment can be read in the ruins of villages all but obliterated in a tangle of tropical plants. In order to understand these things we must examine region by region the ways in which the inhabitants have attached themselves to the land during the various periods of Venezuela's history.

The Regions of Venezuela. The territory which is now included in Venezuela is made up of four major divisions, only one of which is densely populated. The backbone of the country, not only in terms of its surface features (Map 11) but also in terms of population and settlement (Map 15), is formed by the Venezuelan Highlands, a branch of the Andes. A chain of high mountains crosses the border from Colombia south of Lake Maracaibo; thence trending first northeast and then east, it follows the Caribbean Coast, with a gap of about a hundred miles, to the eastern tip of the Paria Peninsula (Map 12). Since this highland backbone is of such importance in terms of settlement, we may discuss it conveniently under four subdivisions: the Central Highlands, in which Caracas and Valencia are located; the Northeastern Highlands; the Segovia Highlands, north of Barquisimeto, including the Paraguaná Peninsula; and the Sierra Nevada de Mérida, south of Lake Maracaibo.

The three other major divisions of Venezuela are not so densely populated as the highlands. Within the Y formed by the Sierra Nevada de Mérida and the range which runs northward along the Venezuelan-Colombian border, lie the Maracaibo Lowlands, in the midst of which there is an extensive lake of fresh water. This lowland constitutes the second of the major divisions of the country. The third division is a vast plain, sloping gently from the southern and southeastern base of the Andes toward the Orinoco River—a region known as the Orinoco Llanos. South of the Orinoco River is the fourth division, a thinly populated region which makes up about half of the total national territory—the Guiana Highlands.

I THE VENEZUELAN HIGHLANDS

1. THE CENTRAL HIGHLANDS

Physical Conditions

That part of the highland backbone which borders the Caribbean between Puerto Cabello and Cape Codera has become the nuclear region of Venezuela. On this part of the country the political interests come to a focus, and here one finds the densest rural populations and the largest city.

The Caribbean Coast which borders the Central Highlands is dry and hot. Some eleven inches of rain at La Guaira is not enough to support more than a scanty cover of xerophytic plants, among which the cactus is prominent. Throughout the year the prevailing wind is from the east, so that protected anchorages are to be found only on the western sides of promontories or peninsulas; yet the protection from the wind which is desirable for landing places is most undesirable for health and comfort. As far as average annual temperatures are concerned, this Caribbean Coast has the highest records of the American tropics, although extreme temperatures are higher elsewhere (Maps 8a and 8b). La Guaira, for example, has an average annual temperature of 80.8°.

The mountains of the Central Highlands rise abruptly from the coast to elevations of between seven and nine thousand feet. The dry conditions are restricted to the first few hundred feet of the mountain slopes. Above that an abundant rainfall supports a cover of forest which continues to the tree line between six and seven thousand feet above sea level.

The Central Highlands are composed of two distinct ranges, separated by the intermont basin in which Valencia is located and by the eastward continuation of this basin, the deep valley of the Río Túy (Maps 11 and 12). In the center of the Basin of Valencia there is a shallow body of fresh water known as the Lake of Valencia. Less than a century ago the water in this lake was high enough to find an outlet through a gap in the mountains to the southeast, but since 1900 the water level has dropped sixteen feet and at present there is no surface outlet. As a result, the margins of the lake are bordered by a marshy lacustrine plain which is especially wide on the east and on the west. The lake divides the Basin of Valencia into two parts. On its eastern side the lake receives the drainage of the Río Aragua, a river which is too short to appear on the accompanying maps. The drainage of the easternmost part of the Basin,

however, has been captured by the headwaters of the Río Túy (Map 11) which plunges eastward through narrow gorges and over many rapids to its funnel-shaped lowland outlet to the Caribbean.

The ranges of mountains on either side of the Río Túy and of the Basin of Valencia are too narrow to include any very extensive areas of gentle slopes. A few small river basins, however, are to be found nestled in the midst of the mountain country. The most important is the Valley of Caracas. Nine miles south of the Caribbean Coast the northern range is broken by a narrow structural depression, a rift, which extends for about fifteen miles east and west. In this rift valley there is a narrow strip of gently sloping land almost entirely surrounded by steep mountains.

The climatic conditions and the cover of natural vegetation in the Central Highlands are of an extremely complex pattern. Temperatures decrease, in general, with increasing altitude, and averages of less than 65° in the coldest month begin about 3,000 feet above sea level. The Basin of Valencia, however, is only about 1,500 feet in altitude, and the Valley of Caracas is barely 3,000 feet. Throughout the area, rainfall and humidity are high on slopes which face toward the prevailing winds. The east-facing valley of the Río Túy and also of the Río Yaracuy (west of Puerto Cabello) receive plentiful rains which support a forest cover. Most of the highland area was originally covered with a mixture of scrub forest and savanna.

Agricultural Settlement

The Spaniards found in the Basin of Valencia, and in other smaller basins of the Central Highlands, places where the slopes were gentle enough and the ground water was plentiful enough for commercial agriculture to be profitable. Failing to discover wealth in the form of precious metals, they turned to the production of commercial crops, making use of cheap land and slave labor. Soon after the conquest the highland region, as well as much of the more remote country outside of the highlands, was partitioned among a relatively small number of Spaniards. The crops which were raised included a mixture of those native to America and others introduced from the Old World. The native American food grain, maize, was widely cultivated for the needs of the workers, but only on land not suitable for the production of the crops which brought profits to the owners. Sugar cane was perhaps the most valuable of the new crops, and for a time Venezuela participated in the

NORTHERN VENEZUELA
SURFACE CONFIGURATION
SCALE
0
100
MILES
GOAJIRA PEN.
CURAÇAO
WILLEMSTAD
BONAIRE
PARAGUANA PEN.
MARGARITA I.
CARIBBEAN
SEA
CORO
TUCACAS
LA GUAIRA
CAPE CODERA
CARACAS
PUERTO CABELLO
VALENCIA
BARQUISIMETO
GUANTA
BARCELONA
CUMANA
NARICUAL
MATURIN
MARACAIBO
LAKE
MARACAIBO
SEGOVIA HIGHLANDS
RIO TOCUYO
YARACUY
RIO
TUY
RIO
VALERA
CALABOZO
LLANOS
MÉRIDA
SIERRA NEVADA DE MÉRIDA
ORINOCO
RIO
APURE
RIVER
ORINOCO
CIUDAD BOLIVAR
HIGHLANDS
GUIANA
CUCUTA
SAN CRISTOBAL
COLOMBIA
VENEZUELA
PLAINS
BASIN OF VALENCIA
HILLY UPLANDS
ANDES
72°
68°
64°
12°
8°

Map 11

NORTHEASTERN VENEZUELA
Selva
Semideciduous forest
Scrub forest (caatinga)
Savanna
0
100
Miles
Aruba I.
Curaçao I.
Bonaire I.
Willemstad
Coro
La Vela
Tucacas
Puerto Cabello
Maracay
La Guaira
Caracas
San Felipe
Barquisimeto
Valencia
Tortuga I.
Margarita I.
PENINSULA OF ARAYA
Cumaná
PENINSULA OF PARIA
TRINIDAD
Port of Spain
Tobago I.
Barcelona
Orinoco Delta
Barinas
R. Portuguesa
Rio Apure
San Fernando
Orinoco R.
Ciudad Bolivar
San Felix
El Callao
Rio Arauca
12°
10°
8°
70°
68°
66°
64°
62°
Raisz

Map 12

rapidly expanding sugar market in Europe, then being supplied chiefly from Brazil. In 1784 coffee was introduced. The landowners discovered, however, that they could tempt the foreign markets with some of the new American products, such as cacao, tobacco, and indigo. The latter crop brought such good returns during most of the colonial period that many areas of settlement were supported by the plantations not only in the Central Highlands but also in other less-favored parts of the country. Now that chemical dyes have taken the market away, however, indigo is no longer of any importance, and the plantations have been abandoned or put to other uses.

Although the type of agriculture has changed notably in the course of the four hundred years of Spanish settlement, the Basin of Valencia has remained the chief agricultural area of the country. On the well-drained lands around Valencia in the west, and in the Valley of the Río Aragua in the east, a variety of agricultural products is to be found today. The dominance of sugar cane, still the chief crop of the area, is challenged by cotton for the textile factories of Valencia and Caracas, and by the increasing attention given to maize, rice, and beans for the supply of the rising urban population.

The Basin of Valencia has also become the center of the Venezuelan cattle business. The necessity of providing fattening pastures for the lean animals raised on the savannas of the Orinoco Llanos has given the lacustrine plain around the Lake of Valencia a position of dominant importance, for no other equally suitable place for the preparation of cultivated pastures is available. The ruler of the country, General Gómez, by gaining possession of these pastures, was in a position to control the entire cattle industry. He built a modern dairy plant and slaughter house at Maracay, east of the Lake of Valencia (Map 12), and from these establishments supplied the urban market in Caracas. Over the new concrete highway motor trucks bring supplies from the Basin of Valencia to the capital. It is interesting, however, that the new refrigeration plant at Maracay was not a successful investment, for the people of Venezuela do not like chilled meat; they prefer freshly killed meat in spite of the fact that it is tougher than meat which has been stored for a period of time. The tastes developed from childhood are not quickly overcome, even for the financial profit of a dictator.

Outside the Basin of Valencia and the Valley of Caracas, coffee and cacao have become the most important commercial crops which are raised on the estates of the large landowners (Map 14). Cacao plantations cover the bottoms and lower slopes of the wet, east-facing valleys

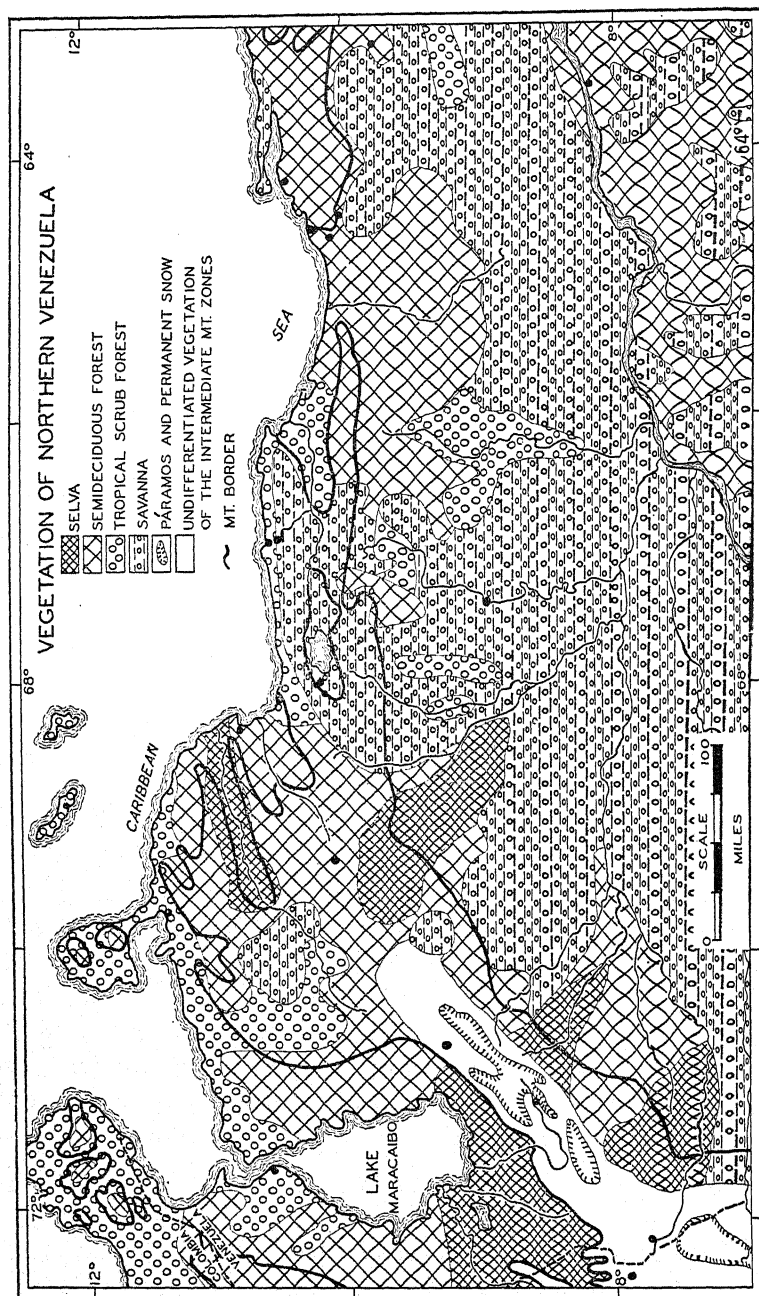
such as that of the Río Túy. Cacao plantations are also important along the wetter slopes of the Coastal Range overlooking the Caribbean. Coffee, however, is Venezuela's most important export crop. It has reached and held this position, in part because Venezuelan coffee is of such superior quality that it commands a higher price than Brazilian coffee on the world market, and in part because coffee fits so well into the local economy. With a minimum of labor, coffee trees can be grown on slopes too steep for most other uses. In a country which suffers, as Venezuela does, from a chronic shortage of labor, and in which there are many steep slopes near the more densely occupied intermont basins and valleys, coffee can create economic values in areas which would otherwise be of little commercial use. The trees are planted in haphazard fashion on the slopes between 1,500 and 6,500 feet above sea level. The better-flavored coffee comes from trees grown at the higher altitudes.

The land given over to the production of food for the rural people is generally too poor or too difficult of access for other uses. Nevertheless, maize alone occupies more area than all the commercial crops combined. For a people who still cultivate the land with the hoe, steepness of slope is of minor significance. The chief food crops, maize, rice, beans, manioc, and bananas, are widely scattered with little relation to the terrain. Because only poorer lands are devoted to the production of food and because methods of cultivation are exceedingly primitive, yields per acre are very low: Venezuela must import a considerable quantity of foodstuffs each year.

The density of the rural population is not very great, even in the areas of chief concentration in the Central Highlands (Map 15). The greatest density is in the Valley of Caracas where there are about 125 rural people per square mile. Many of the people in this district gain at least a part of their incomes from work in the city. East and west of the lake in the Basin of Valencia the density of rural population is between 50 and 60 per square mile. The coffee plantations on the mountain slopes and the cacao plantations at the lower altitudes have between 10 and 25 people per square mile. Even in this central region there are large areas with fewer than 10 people per square mile.

Development of Roads and Railroads

Roads, railroads, and other means of circulation are of special importance to commercial people. Most of the Venezuelans make little use of roads more elaborate than trails for mules. But the minority of com-

VEGETATION OF NORTHERN VENEZUELA
SELVA
SEMIDECIDUOUS FOREST
TROPICAL SCRUB FOREST
SAVANNA
PÁRAMOS AND PERMANENT SNOW
UNDIFFERENTIATED VEGETATION OF THE INTERMEDIATE MT. ZONES
MT. BORDER
CARIBBEAN
SEA
LAKE MARACAIBO
COLOMBIA
VENEZUELA
72°
68°
64°
12°
8°
SCALE
0
100
MILES

Map 13

mercially-minded Venezuelans interested in bringing their products to a central market, or to a port for shipment abroad, are very much interested in transportation facilities. Since the political leaders of the country have also been leaders in the economic life of the country, men like Guzmán Blanco and General Gómez have made considerable use of public funds for the development of the means of transportation.

Caracas and Valencia are both located where relatively low passes across the Coastal Range are available. To reach the Valley of Caracas from La Guaira it is necessary to climb only 3,412 feet. Caracas itself is 3,136 feet above sea level.[1] Yet the slopes which separate Caracas from the sea are so steep that to climb over the pass and down to the city—a straight-line distance of only 9 miles—requires 21 miles of road and 23 miles of railroad. The pass between Puerto Cabello and Valencia is even lower. A valley cut back into the Coastal Range permits access to the Basin of Valencia with a climb of only a little over 2,000 feet.

Most of Venezuela's railroads were built during the rule of Guzmán Blanco, between 1877 and 1893. By attracting foreign capital the dictator succeeded in equipping his country with the kind of transportation which was most desirable at that time. The railroads from La Guaira to Caracas and from Puerto Cabello to Valencia were built with British capital; and these are connected by a line between Caracas and Valencia which was built with German capital. The latter railroad was especially costly because of its 217 bridges and 86 tunnels. The very expensive nature of the construction of all these railroads and the lack of bulky traffic necessitated high rates for shipment, with the result that most of Venezuela's commerce continued to reach the coast or to move inland from the coast over rough trails on the backs of mules.

General Gómez was one of the earliest Latin-American rulers to appreciate the value of all-weather roads for the use of motor trucks. During the first decade of his administration a road-building program was adopted and work started on several great highways—all leading toward Caracas and the Basin of Valencia. One highway was built across the mountains south of Caracas to the edge of the Llanos. In the dry season it is possible to continue across the plains by automobile to the banks of the Orinoco opposite Ciudad Bolívar. Another road connects the Basin of Valencia with the Llanos directly to the southeast, and still another runs far to the southwest along the base of the Andes. The most important highway is the one which runs southwestward from

[1] The station at which the climatic data are taken for Caracas is on the mountain slopes above the town, at an elevation of 3,419 feet.

NORTHERN VENEZUELA
POPULATION
SCALE
0
100
MILES
CARIBBEAN
SEA
NUEVA ESPARTA
SUCRE
MONAGAS
ANZOÁTEGUI
FEDERAL DISTRICT
MIRANDA
GUÁRICO
ARAGUA
CARABOBO
YARACUY
COJEDES
PORTUGUESA
ZAMORA
APURE
BOLÍVAR
FALCON
LARA
TRUJILLO
MÉRIDA
TÁCHIRA
ZULIA
LAKE
MARACAIBO
MAGDALENA
URBAN
MORE THAN 100,000
LESS THAN 100,000
RURAL
EACH DOT 1,000
12°
64°
68°
72°
8°

Map 15

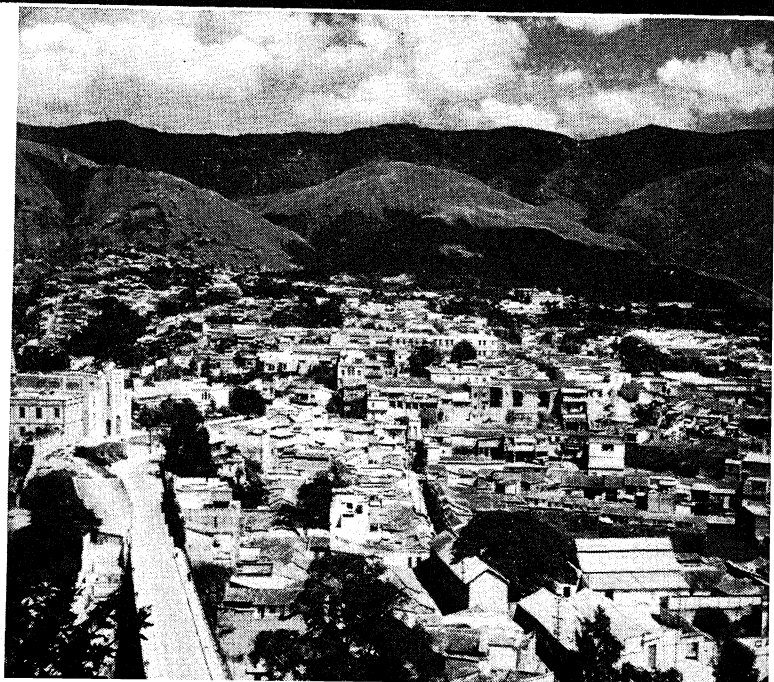
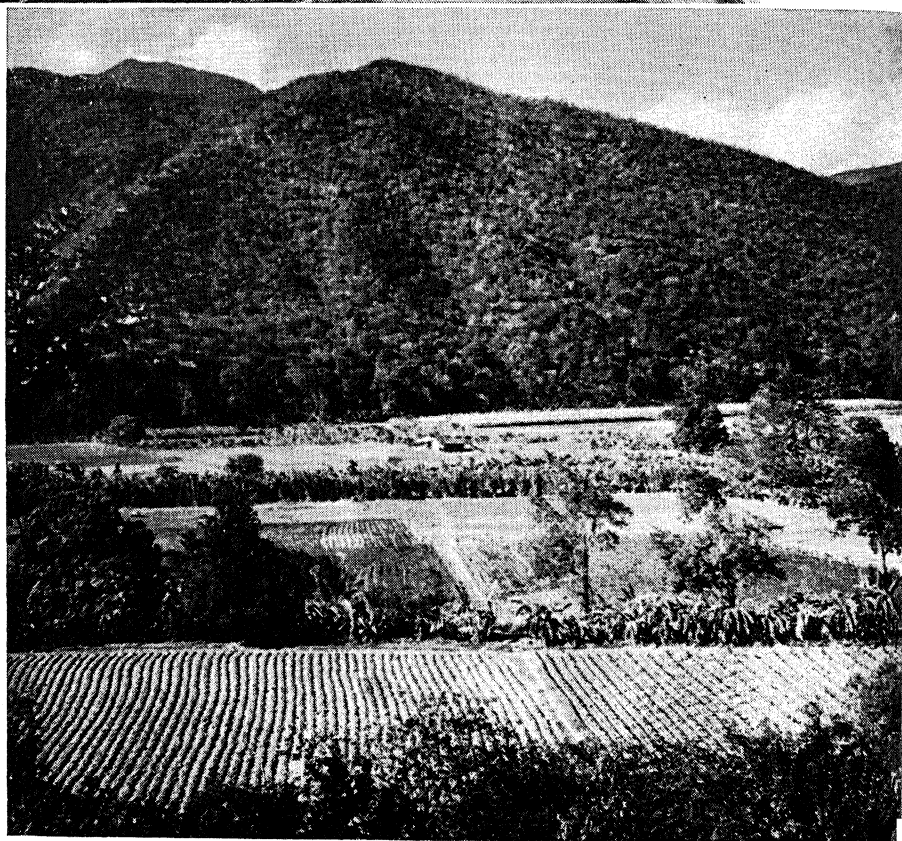
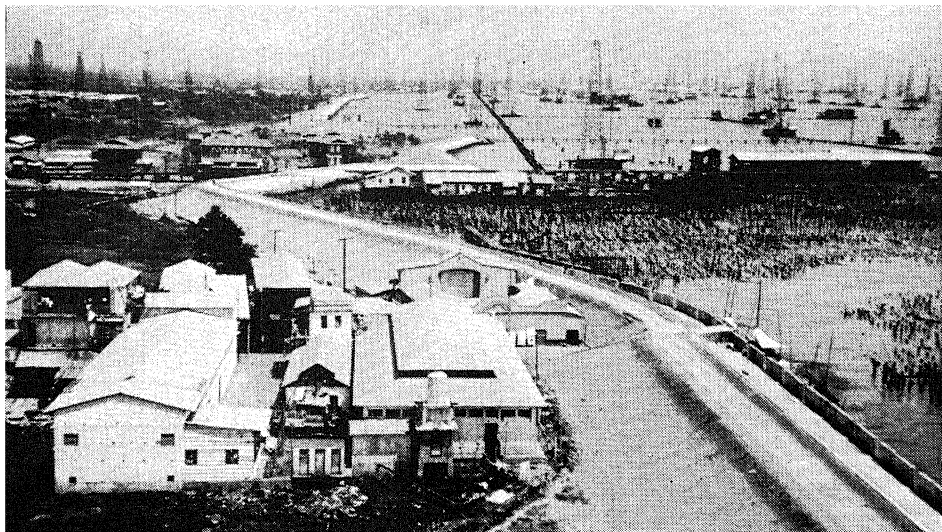
Valencia along the axis of the highlands by way of Mérida to the Colombian border. Motor busses operate on regular schedule between Caracas and Bogotá, capital of Colombia, making use of this important line of travel through the highlands of Venezuela.

After Venezuela's oil prosperity began, about 1920, Gómez spent large sums on his road program. He built a modern concrete motor highway from La Guaira to Caracas, thence to Maracay and Valencia, and down to the Caribbean again at Puerto Cabello. For the tourists who are visiting Venezuela in increasing numbers this fine highway is very impressive, and for the transportation of the meat and dairy products of the Basin of Valencia to the Caracas market it is most important; but for the majority of the Venezuelans, whose mules or donkeys plod along the trails, the highway is only a place of danger to be crossed as quickly as possible. Even less related to the economy of the country was Gómez' road from Maracay to a port on the Caribbean immediately to the north between La Guaira and Puerto Cabello. From his palace at Maracay this route provided a way of escape in the event of trouble.

As a result of all this attention to highway construction, even where the roads served only the interests of a minority of the people, Venezuela stands high among the countries of South America in the use of motor vehicles. In 1936, Venezuela was surpassed in the number of automobiles owned only by Brazil, Uruguay, Argentina, and Chile.

Caracas and Valencia

Caracas and Valencia afford an interesting illustration of the fact that cities do not always grow most rapidly at the most advantageous sites. Caracas has become the outstanding urban center not only of the Central Highlands, but also of all Venezuela; but it has done so in spite of the rugged terrain which separates it from the rest of the country. Caracas is not easy to reach from the coast: to continue southward or southwestward to the other inland centers of the nuclear region requires the crossing of deep narrow valleys and the climbing of steep slopes. There is no natural focus of routes on Caracas. Valencia, on the contrary, possesses several advantages of location: it is surrounded by the largest area of agricultural production in Venezuela; it can be reached from the Caribbean by a relatively easy pass; and the mountains which separate it from the Llanos can be crossed by means of several passes without serious difficulties. Nevertheless, its somewhat lower altitude, together with the disease-carrying insects which breed on the swampy borders of

The Gran Carretera Occidental (*above*) runs southwestward from Caracas to Maracay and Valencia (Map 12). It is part of the Pan American Highway which eventually will connect all the nations of South America. (Courtesy of the Venezuelan Chamber of Commerce.) Caracas (*below*) is located 3,000 feet above sea level in a valley bordered by ranges of the Andes. It was here that Simón Bolívar was born. This capital city is a veritable garden of flowers. (Courtesy of the Grace Line.)

Lagunillas (*above*) is the largest producing oil field in all of Latin America. This landscape has been created out of a mangrove swamp on the eastern shore of Lake Maracaibo, largely during the last fifteen years. The concrete dike in the foreground permits the drainage of the swamp and the construction of buildings. Many of the wells are sunk in the lake bottom. (Courtesy of the Raymond Concrete Pile Co.) The lower picture shows an hacienda near Caracas, where

the Lake of Valencia, led the early settlers to leave the sugar lands under the direction of overseers, and to make their homes in Caracas. Once Caracas became the capital city, its pre-eminence in the economic and social life of the country was assured. During the passing centuries its more advantageously located rival has been left farther and farther behind.

2. THE NORTHEASTERN HIGHLANDS

While the Central Highlands region was being made into more and more of a focus of political, social, and economic activity, and while its chief city was growing rapidly, the northeastern part of Venezuela, beyond the Gulf of Barcelona, remained static. In this region the Coastal Range, which forms the two peninsulas of Paria and Araya, is only about 2,600 feet high. The central mountain core of the northeast lies south of the structural depression in which Cumaná is situated (Map 12); here the summits reach 6,700 feet above the sea. Abundant rains over the whole eastern part of the region supported an original cover of selva, or tropical rain forest, in which, at present, small clearings are used for the production of cacao. The western part of the region, on the other hand, is relatively dry, and was originally covered with scrub forest and savanna.

Most of the inhabitants of the Northeastern Highlands live on the drier western side. Cumaná, the oldest European settlement in South America, is now a town of some nineteen thousand people, and is by far the largest center of the northeast. The neighboring port of Guanta is connected by railroad to the cattle-shipping town of Barcelona and also to some small mines of lignite and semibituminous coal near by (Map 14). These mines are of small importance, producing between fifteen and seventeen thousand tons annually for use on some of the Venezuelan railroads. There are also some centers of oil and asphalt production on the western side of the Gulf of Paria, corresponding to similar developments in Trinidad. Attempts made since 1920 to settle colonies of German pioneers in this eastern section have not been successful, and the region as a whole continues its gradual decline in population.

3. THE SEGOVIA HIGHLANDS

The third section into which the highlands of Venezuela may be divided is the Segovia Highlands, which lie north of Barquisimeto. This is another of the poorer sections of Venezuela; it is a region of recurring droughts which have had the effect of limiting the settlement to those

spots along the river valleys which remain permanently wet. Most of the area has fewer than ten people per square mile, although small clusters of people are located in the vicinity of Coro, around the oil refineries on the Peninsula of Paraguaná, in the valleys of the Río Tocuyo and the Río Yaracuy, and in the neighborhood of Barquisimeto.

All of this region lies north of the main axis of the highlands which, west of Puerto Cabello, trends southwestward away from the coast. North of the valley of the Yaracuy the Segovia Region is composed of deeply dissected plateaus, surmounted by a few isolated ranges of low mountains and hills (Map 12). The rainfall decreases and becomes less and less certain toward the north. Although the east-facing valleys of the Tocuyo and the Yaracuy receive sufficient rain to support a dense forest, the rest of the Segovia Highlands is covered with patches of dry scrub forest and savanna; excepting for the larger rivers most of the streams are intermittent.

Coro, at the base of the sandy spit which connects the Peninsula of Paraguaná to the mainland, has never prospered. The adjoining territory is sparsely inhabited by a people who produce so little for export that they can purchase little from outside. The rural people are grouped in small areas of settlement wherever water can be assured even in dry years. The Indian and mestizo inhabitants devote small patches of wet land to maize and manioc, but most of the area is used only for grazing of goats and thin scrubby cattle.

The densest populations of the Segovia Highlands are in the territory between Tucacas and Barquisimeto (Maps 11 and 15). Near the latter city the rural population is between twenty-five and sixty per square mile. The greater part of the cultivated area is utilized for subsistence products, but plantations of coffee and cacao provide a small current of exports. There is one mining community in this district. The copper mines at Aroa (Map 14), which were owned at one time by Bolívar, have had a history of fluctuating prosperity. Low prices in the world copper markets after the First World War caused the abandonment of these mines. Today they are so badly flooded that to open them again would prove very costly.

The railroad which connects Barquisimeto to the coast at Tucacas is an extension of what was probably the first railroad to be built in South America. In 1835 Aroa and Tucacas were connected by rail, but operation of the line was given up after a few years. In 1877, at the beginning of Venezuela's chief period of railroad construction, the line was reopened and extended to Barquisimeto.

4. THE SIERRA NEVADA DE MÉRIDA

The southwestern end of the Venezuelan Highlands is formed by the high Sierra Nevada de Mérida. In this region several small intermont basins are occupied by small clusters of people, predominantly Indian and mestizo; difficulty of access has retarded the invasion of the region by large landowners interested in commercial production. In fact, all the more remote sections of Venezuela have suffered in comparison with the Central Highlands in the matter of easy access to the Caribbean ports. In the Central Highlands contact with outside markets has been continuous; there, the rulers of the country, wherever they may have originated, have finally established themselves. Gómez himself was born in the Sierra Nevada de Mérida near San Cristóbal, and even spent a part of his life across the border near the Colombian city of Cúcuta; but he emerged from these remote places when he began his career as political leader. The almost complete isolation of the Sierra Nevada de Mérida was finally ended, however, by the rise of coffee as a crop of commercial importance in the nineteenth century.

The Sierra Nevada de Mérida is the only part of the Venezuelan Highlands where permanent snow is found at higher elevations (Map 13). In the vicinity of Mérida itself there are five snow-capped peaks, about 16,000 feet in altitude. The valleys and basins, however, are all at relatively low elevations, and the transverse trench through which the boundary between Venezuela and Colombia passes permits a crossing of the mountains from the Llanos to the lowlands around Lake Maracaibo with a climb to only 4,600 feet above sea level.

In high mountain regions of the low latitudes, such as the Sierra Nevada de Mérida, the characteristics of the various elevations are so distinct that the local inhabitants recognize general "vertical zones." The lowest zone in Spanish America is known as the *tierra caliente*, or hot country, which may also be called the "Zone of Tropical Products." The average annual temperatures on the lower mountain slopes and in the deeper valleys are mostly between 75° and 80°, with a difference between the average of the coldest month and the average of the warmest month of not more than three or four degrees. The upper limit of this zone in Venezuela is about 3,000 feet, although of course no sharp line separates one of these general vertical zones from another. Between 3,000 and 6,000 feet in elevation is a cooler region which the people call the *tierra templada*, or temperate country, which may also be designated the "Zone of Coffee." Average annual temperatures at these altitudes vary be-

tween 65° and 75°, but the ranges between the coldest and the warmest months are a little less than those in the tierra caliente. Between approximately 6,000 and 10,000 feet in elevation is a zone which is still cooler, known as the *tierra fría,* or cold country, which we may call the "Zone of the Grains." Here, average annual temperatures are between 55° and 65°, and there is practically no difference in temperature from one month to another. The crop found at the highest altitudes is the potato, which in these mountains reaches an upper limit of a little over 10,000 feet. Above the upper limit of forests and of agriculture but below the lower limit of permanent snow, is the "Zone of Alpine Meadows" to which the people in northern South America apply the term *páramos.* In this part of Venezuela the páramos are found from approximately 10,000 feet to the snow line at 15,400 feet.

The valleys and intermont basins, where settlement is concentrated, lie mostly between 4,200 and 2,600 feet above sea level. The three chief centers of population, Valera, Mérida, and San Cristóbal, are all in this zone. There are very few settlements in the tierra fría, and above that there is only one small village of pastoral people, in the páramos.

The intermont basins and valleys in the tierra templada were occupied at the time of the Spanish conquest by some of the most energetic of the native peoples of Venezuela—a people who formed a striking contrast with their less robust neighbors in the Maracaibo Lowlands. The Indians, who were not interested in commerce and for whom the isolation of this mountainous country from the Caribbean was a matter of no importance, found in it far better living conditions than they did in the Central Highlands of Venezuela. Probably the most important reason for the high degree of habitability of the Sierra Nevada de Mérida was that the Indians depended on maize as their basic food, and this was very productive maize country. Today this grain can be grown up to 7,500 feet above sea level; and, most important of all, up to elevations of about 6,000 feet two harvests can be made each year. This part of Venezuela shares with the highlands of Colombia the climatic peculiarity of two distinct rainy seasons and two distinct dry seasons—the rainy seasons in Mérida come from April to June and from August to November. As a result, the Indians of this region were able to supply themselves with a greater abundance of food than the highland Indians were able to obtain in the vicinity of Caracas, where only one rainy season occurs. Better diet, probably, rather than lower temperatures, made possible the relatively dense populations of vigorous Indians; but the lower temperatures worked indirectly to improve the health conditions

after the arrival of European diseases, for the fever-carrying insects are less numerous above the tierra caliente. The stamp of physical vigor is still on the people of this part of Venezuela.

The European settlement of the Sierra Nevada de Mérida, however, did have to face the problem of difficult accessibility. After the first towns had been founded by people from Bogotá, there was little further activity because of isolation and the lack of precious metals. Planters of sugar cane and indigo were unable to place their products on the market as cheaply as could the planters of sugar cane and indigo in the more accessible Central Highlands. Not until coffee became an important commercial crop did the people of Mérida find a product which could support the high costs of transportation development; today the Sierra Nevada de Mérida is the chief coffee-producing region of Venezuela.

The routes to the coast from this region follow the valleys downstream to the Maracaibo Lowlands. The new automobile road ties the region more closely to Caracas, but has not yet been able to capture the coffee shipments. Transportation is by mule over mountain trails down to the border of the lowlands, where three short railroad lines have been built through the forested country to connect the highland trails with water navigable for shallow-draught boats (Map 14). Only one of these railroads actually penetrates the mountains; it has been built from a navigable river in the southwestern part of the Maracaibo Lowlands to Cúcuta in the mountains of Colombia, not far west of the Venezuelan border.

II. THE MARACAIBO LOWLANDS

Until recently the Maracaibo Lowlands remained, along with the Segovia Highlands and the Northeastern Highlands, among the poorer parts of Venezuela. Since this region lies midst higher land that all but surrounds it, there are no steady winds to relieve the oppressive humidity; in this area has been recorded the highest average annual temperature of any part of Latin America. The city of Maracaibo has an annual average of 82.4°, ranging from an average of 80.6° in January to an average of 84.4° in August. On the shores of the lake, after sunset, when the local winds of the daytime have died down, the steamy humidity is very trying, especially for people who must wear clothes; the southern sky is brilliantly illuminated with vivid flashes of lightning which play among the towering banks of cumulus clouds along the mountain slopes. Throughout the southern part of the lowlands and especially on the slopes of the Sierra Nevada de Mérida, heavy rainfall supports a dense growth

of selva; toward the north the decrease of rainfall produces a gradual transition from tropical rain forest, through semideciduous forest, to dry scrub forest (Map 13).

A large lake of fresh water, 120 miles long by 60 miles wide fed by the heavy rainfall of the southern part of the basin, occupies the bottom of the Maracaibo Lowlands. Its shores are low, swampy, and infested with mosquitoes. The river, 34 miles long, which connects this lake with the Caribbean, is too shallow to permit the passage of ocean vessels, since several places in its channel are no more than eleven feet deep. Maracaibo, located on the banks of this river near its outlet from the lake, has controlled the commerce of the region, such as it was, since the days of the Spanish conquest.

Until 1918, however, settlement in the Maracaibo Lowlands was of little importance. After coffee plantations began to send products from the Sierra Nevada de Mérida out to the coast over the Maracaibo route, the lake became a waterway of local significance. Transportation was by sloop, and connection with ocean vessels was made at Puerto Cabello or at La Guaira. In the southern part of the Maracaibo Lowlands, along the routes which led to the highlands from the lake or river ports, there were some plantations of sugar cane and cacao, and a few patches of coconuts; but except for the population of these few settled localities and the small town of Maracaibo, the only inhabitants of the lowlands were the Indian fishermen, whose villages, built on piles out in the lake, had excited the interest of the first Spanish explorers.

The people who gained such a miserable living from the land knew nothing of the potential wealth beneath their feet, nor did the fishermen appreciate the black sticky substance that sometimes contaminated the water of the lake and fouled their fish nets. Geologists, however, long ago reported the existence of oil, and of oil-bearing formations throughout the northern part of the region and across the northern half of the Segovia Highlands to the east. Not until after the First World War did the petroleum companies turn their attention definitely to Maracaibo.

Oil has transformed the national economy of Venezuela from that of a rather poor tropical country, struggling under the dislocations of frequent revolution and the high cost of maintaining an ordered system of government, to an economy which is, temporarily at least, among the soundest in the world. Venezuela emerged from the years of depression free from debt and with a substantial balance of income over expenses—of all the countries in North or South America, it is the one in

the best financial condition. General Gómez was largely responsible for this, for he so regulated the concessions granted to foreign oil companies that the public treasury was insured of a substantial share of the profits. The revenue of the government treasury was four times as great in 1930 as it had been in 1915. From the first production of oil in 1918 the amount exported was doubled each year until 1928, when Venezuela stood second only to the United States. In 1932 Venezuela was third, having fallen behind the Soviet Union, and accounted for 9 per cent of the total petroleum production of the world. Nearly three thousand wells have been drilled in the various concessions. The largest single producing oil field in all of Latin America is on the eastern shore of Lake Maracaibo near the village of Lagunillas (Map 14). This one field in 1932 produced half of the total Venezuelan output.

The oil industry in the Maracaibo Region is a result of foreign enterprise. Only about 10 per cent of the investment comes from Venezuela; the remainder is divided about equally between British and North American oil companies. Labor is recruited in Venezuela, but the work is directed by foreign geologists and engineers, using imported materials and machines. Practically all the oil is taken out of the region in shallow-draught tankers to refineries which can be reached by ocean boats, located either on the Dutch islands of Curaçao and Aruba or on the Peninsula of Paraguaná (Maps 11 and 12).

In the process of exploiting the oil, however, the Maracaibo Region has been transformed. Oil derricks have been erected both in the swamps around the shore of the lake and over the water of the lake itself. The small fishing villages are now lost in a vast complex of pipe lines, pumping stations, storage tanks, machine shops, and oil company offices and dwellings. Oil and gas fill the air with their characteristic penetrating odors. Oil spilled on the surface of the lake has aided in the control of mosquitoes, but has seriously increased the fire hazard, as was demonstrated in November, 1939, when a conflagration destroyed the lake village of Lagunillas with great loss of life.

Perhaps the greatest transformation of all has been accomplished within the city of Maracaibo. In 1918 this was a small, primitive town of some 15,000 inhabitants, mostly Indian and Negro. Its aspect had changed little since the sixteenth century—it was without pavements or sewers, or any of the evidences of a modern city. In the short span of ten years it became the second city in Venezuela, a little metropolis with paved streets, modern public services, tall office buildings, golf clubs, and substantial dwellings. Its population is now 110,000, of

whom at least 30,000 are white foreigners. During the early stages of this growth Maracaibo was a typical frontier boom town, but little by little the chaos resulting from rapid development, both external and internal, was replaced by the familiar order of a commercial and industrial city.

III. THE ORINOCO LLANOS

The remarkable and exotic development in the Maracaibo Region, based on the exploitation of oil, has not created a form of settlement which is in any way permanent or stable. For permanence, if not stability, one must turn to the most persistent of all the forms of Venezuelan economy—the cattle industry of the Llanos. Since early colonial times the extensive grasslands south of the coastal mountains have been utilized for the pasturing of herds of cattle on vast estates which are owned, for the most part, by people who make their homes in the Central Highlands Region. The pastures in the Basin of Valencia have been utilized for hundreds of years for the fattening of cattle from the Llanos. The cattle business is a form of economic activity which has survived all the other temporarily more profitable ways of exploiting the resources of the land; here is a way of life, for that reason, which is traditionally Venezuelan. Long after Maracaibo returns to a sleepy existence in the midst of memories of the oil period, the herds of cattle on the Llanos will continue to play a part of fundamental importance in the national life of Venezuela. But this cattle business has not been established in a region which could be called a first-class grazing land. In fact, the land is so poorly suited to the production of beef cattle that in terms of money values the industry is economically submarginal. It persists in spite of natural obstacles because the people of the Llanos do not react to economic forces the way Anglo-Americans do. The principles of economics, as derived from Anglo-American experience, have no significance where the economic traditions are so different.

The Llanos of the Orinoco consist of a vast almost featureless plain, lying between the Andes and the Orinoco River (Map 12). This savanna-covered plain is approximately 600 miles long and 200 miles wide. It slopes very gradually from the base of the Andes toward the river. Even in its highest part, north and northwest of Calabozo (Map 11), it is little more than 600 or 700 feet above sea level. The streams which cross it wind about in broad valleys with low gradients; and between the valleys low mesa-like interfluves are the most conspicuous

features of the landscape. If all this region were good pasture land it could support perhaps 50,000,000 head of cattle.

But, for several reasons, it is not good pasture land. The year is divided into a rainy season and a dry season, and during these two extremes the landscape of the Llanos undergoes an extraordinary transformation. The rains begin in April, and after a period of alternating rainy and dry weather, the wettest part of the season continues from June to October. So heavy is the rainfall of these five months that the rivers are unable to carry off all the flood waters, and vast expanses of land are inundated, especially in the country near the Orinoco. At this time, animals are concentrated on the low mesas that stand as islands above the floods. After they have eaten one of these islands bare, they are driven to another, sometimes being forced to wade many miles through shallow water to reach it. Most of the herds at this time of year are driven to the higher ground between Calabozo and Valencia.

In October the rains begin to abate. After a transitional period of occasional showers in November and December, the real dry season begins in January and continues without sign of rain until the end of March. The flood waters recede; only the larger rivers continue to flow freely, and the smaller ones are gradually reduced to chains of swamps and pools along the valley bottoms. The tall rank growth of savanna grasses turns brown and hard and becomes inedible. The low bushy trees of the patches of scrub forest lose their leaves and stand bare as if in a mid-latitude winter. The higher ground north of Calabozo with its light sandy soil becomes very dry, and the herds of cattle must be driven far to the south to the wet spots near the Orinoco. At the end of the dry season the dry grasses are regularly burned to make the young growth accessible to the hungry cattle. Only when the young green shoots of grass appear at the beginning of the rainy season or in the stagnant waters of the receding floods can cattle find satisfactory pasturage, and even then the native grasses are low in food value. Most of the year the herds barely avoid starvation.

The vegetation of the Llanos is anything but uniform. The savanna varies from tall bunch grasses which grow in the drier parts to the short grass of the wet spots. Patches of dry scrub forest interrupt the grassy areas, and over considerable stretches there are scattered palms. Lining the courses of the permanent streams are ribbons of dense galeria forest composed of broadleaved evergreen species.

Perhaps no other kind of region is plagued by such a variety of insects as a tropical savanna. Mosquitoes and flies of many species breed in

the stagnant waters or the rank grasses. They not only make life extremely uncomfortable for man and beast, but also spread a variety of diseases, some of which are deadly.

Settlement of the Llanos

To the native Indians of Venezuela the Llanos were almost uninhabitable. Since these Indians lacked the technical ability to irrigate or drain the land and since they had no domestic animals to make use of the savanna grasses, they could occupy the lowlands only where there was sufficient rainfall to support their crops, or where the permanent rivers contained enough fish. Indians lived on the forested delta of the Orinoco, but they avoided the grassy plains.

Cattle were first introduced into the Llanos by the Europeans in 1548. One important advantage compensated in part for the handicaps with which these cattle had to struggle—a complete freedom from carnivorous enemies. A century later herds of wild cattle numbering perhaps 140,000 were reported as grazing on these plains. By 1812 the number had been increased, under the care of seminomadic cattle men, or *Llaneros*, to about 4,500,000. But immediately after this the Wars of Independence reduced not only the number of cattle but also the number of Llaneros, for these hardy cattlemen were in great demand as fighters. By 1823 the number of cattle had dropped to 256,000.

During the remainder of the nineteenth century the number of animals rose or fell in accordance with the political stability of the country. Gúzman Blanco took a personal interest in the cattle business. He introduced better breeds of cattle and insisted on better methods of caring for them. As a result, by 1883 the number of animals exceeded eight million. This was the largest count ever made: by 1920 the number was down again, this time below three million.

General Gómez, also, took a direct personal interest in the pastoral activities of Venezuela. He introduced the zebu cattle, crossing them with the native stock to gain a greater resistance to the insect pests. This breed of cattle, which came originally from India, has been found to provide better meat and better dairy products in the wet tropics than the common European breeds, for the rather oily hide of the zebu is more of a defense against the flies and ticks which infest the pastures.

In his later years General Gómez held a virtual monopoly of the cattle business. Large foreign-owned ranches on the Llanos which, during the First World War, sent cattle to a British packing plant at Puerto Cabello, were forced out of business. This was accomplished in a very

simple manner. Gómez imposed taxes on all herds of cattle driven across state boundaries; since no clear distinction was made between his private funds and the public funds in the federal treasury, the taxes he paid on his own herds were, in reality, paid to himself. He made the taxes so high that no one could compete. He also owned the fattening pastures around the Lake of Valencia.

Cattle from the Llanos are taken to market over three chief routes. The relatively small number of animals in the eastern part of the region mostly enter the West Indian trade, either on the hoof, or as salt beef. They are shipped out by way of Ciudad Bolívar and Port-of-Spain, or by way of Guanta. The most important route to market, however, is through the Basin of Valencia. Whether the animals are to be slaughtered at Puerto Cabello for export, or in Maracay for the domestic market, they must first be fattened on the wet pastures around the Lake of Valencia.

Although the Llanos have remained primarily pastoral, agricultural settlement was at one time successfully attempted. As long as such money products as tobacco and indigo could be raised by slave labor, transported by slaves to the coast, and sold in a closed market in Spain, it was profitable to maintain an agricultural population on some of the large estates. During a part of the colonial period the population of the more accessible portions of the Llanos was undoubtedly higher than it is today. When slavery was abolished in 1854, when competition in the open markets had to be met, and when indigo was entirely eliminated by the development of chemical dyes, agriculture on the Llanos ceased to be profitable. At present a seminomadic pastoral people occupy the region, with a density of fewer than ten persons per square mile.

Even the Llaneros, however, who have remained the only permanent inhabitants of this region, surviving where the agricultural people have failed, cannot be said to have made a profit from herding cattle. There is no strict accounting in terms of money values as far as the Llaneros are concerned. To these people cattle-herding is not a business enterprise, but rather a way of living (40). Only by people with such an attitude could herds of cattle be maintained permanently in the face of the serious natural obstacles which exist in the region.

IV. THE GUIANA HIGHLANDS

About half of the national territory of Venezuela lies south of the Orinoco River in a region known as the Guiana Highlands (Map 6). This is a part of South America which is very thinly inhabited (Map 1),

and not very well known. The surface is composed of rounded hills and narrow valleys formed on ancient crystalline rocks. Standing conspicuously above the general upland level, especially in the far south along the border of Brazil, are groups of plateaus and mesas, capped with resistant sandstone. These flat-topped tablelands reach the highest elevation in Mt. Roraima (8,635 feet above sea level), on the border of Venezuela, Brazil, and British Guiana. The crystalline hilly upland begins immediately south of the Orinoco River; in fact, the river in several places flows across spurs of the upland, each of which produces a narrowing of the channel and limits navigation. The first of these narrows above the mouth of the river is just upstream from Ciudad Bolívar, and suggested the original name of this town—Angostura.

The Guiana Highlands are covered with intermingled savanna and semideciduous forest (Maps 7 and 105). The grassy openings are apparently extensive and very irregular in outline; the detailed mapping which would make possible the precise description of the relations of grasslands and forests in this region has yet to be done. One of the finest popular descriptions of this mixture of forest and savanna was written by W. H. Hudson in *Green Mansions*.

For several reasons the Guiana Highlands are less subject to extremes of flood and drought than are the Orinoco Llanos. The year is sharply divided, as it is in the Llanos, into a rainy season and a dry season. But the hilly nature of the terrain reduces the area which is subject to floods, and the cover of forest reduces the surface run-off. Except for the factor of isolation, the Guiana Highlands might be considered to be physically better suited for use as grazing land than is the savanna-covered plain north of the Orinoco.

The remote Guiana Highlands, however, are not lacking in resources to tempt men out into the wilderness. And although geographic information regarding this region is incomplete today and exploring parties can still make important discoveries within its borders, the fact remains that during the four centuries of Spanish rule many people have tramped over its hills or paddled their canoes along its streams. Mission stations were established along the banks of the larger rivers, and small groups of people still are settled around these places. The information gathered by the people who have combed the Guiana Highlands is not inscribed on carefully prepared maps, or in texts written with scientific precision; yet one cannot regard this part of South America as a new land, hitherto unknown and now awaiting only the pioneers to carve spots of civilization out of the raw wilderness.

Gold and diamonds are known to exist in many places throughout the region. The one outstanding mining district, however, is at El Callao (Map 106). The town of El Callao is located 125 miles in a straight line southeast of Ciudad Bolívar, and is reached by a road 112 miles long from the Orinoco port of San Felix, a short distance downstream from Ciudad Bolívar (Map 12). The political center of this district, about twelve miles from El Callao, is now connected by regular air service with the Venezuelan capital, but travel by land is still tedious—requiring many days' journey from the banks of the Orinoco over roads passable only for mules and oxcarts. In 1885 El Callao gold mine was the greatest gold-producer of the world, turning out $200,000 a month from a rich vein. El Callao, together with several other mines in the vicinity, is still productive. But gold-mining is not an economic activity which supports a very large number of people—there are perhaps a thousand employees of El Callao mine; the cluster of people in this mining district is relatively small (Maps 106 and 107).

Ever since El Callao district was opened up it has produced more than 80 per cent of the gold output of Venezuela. The remainder of the gold and the small production of diamonds come from temporary and scattered mining camps where the stream gravels are worked by placer methods.

The Guiana Highlands contain a reserve of minerals which might become of great importance in the economic world, and might some day have a much greater effect on the distribution of people than has the exploitation of precious metals and gems. In 1912 and 1913 a mining company attempted to exploit a deposit of iron ore, located thirty-seven miles south of the port of San Felix along the road to El Callao (Map 104). The attempt failed because of lack of geological knowledge, but subsequent explorations have revealed the presence here of an important reserve of iron ore. There is an enormous volume of ore with an iron content of about 45 per cent, together with smaller quantities of high-grade magnetite and hematite ores running as high as 70 per cent and low in phosphorous content. Geologists now estimate that these and other deposits in the crystalline rocks south of the Orinoco River contain more than a billion tons of ore, most of it near the surface, so that it could be mined by open-pit methods. At present the richest known deposits are owned by a North American steel company. With the exhaustion of more accessible ores in North America and Europe, the steel industries of the world may be forced before long to depend for one of their chief sources of supply on these Venezuelan ores. The

short haul to the navigable lower portion of the Orinoco, and the outlet of this river on the Atlantic would then give this region an advantage of location for the service of the large industrial centers of North America and Europe. The exploitation of South American ores might, likewise, give the southern steel centers of the United States a considerable advantage of location over the northern centers. The development of a steel industry in Venezuela would be handicapped by lack of a market for steel products, by the relatively small population, and by a lack of suitable coal for coking—to say nothing of relative costs of transportation.

Ciudad Bolívar is the focal point for the Guiana Highlands and for the eastern part of the Orinoco Llanos. Founded in 1764, it was for a time made prosperous by the shipment of mules, salt beef, tobacco, and indigo directly to Spain. The decline of agriculture on the Llanos, and the concentration of the cattle business in the hands of owners who lived in the Central Highlands Region have reduced the importance of Ciudad Bolívar. Any increase of interest in the vast empty lands south of the Orinoco either for pastoral and agricultural settlement, or for such large-scale mining activities as would be necessary for the exploitation of the iron ores, would be reflected in a renewed growth of this urban center.

VENEZUELA AS A POLITICAL UNIT

Venezuela has an area of roughly 352,000 square miles and a population estimated at 3,500,000. These figures, taken by themselves, however, are misleading. We must distinguish, as previously noted, between the total national territory and the effective national territory; the population of the country derives its support only from the effective national territory, which, in this case, is less than half the total.

Even within the effective national territory, however, the density of population and the character of the settlement varies greatly from place to place. Between approximately two people per square mile on the more sparsely settled parts of the Llanos and the concentrated population in the city of Caracas there is a very great contrast. But the contrast between the Llanos and Caracas is not only in numbers of people per unit of area; it exists also in irreconcilable ideas and ways of living. Venezuela is made up of an aggregate of diverse elements held together by central governmental authority and by sentiments of nationality.

The first, and perhaps most striking, of the contrasts in Venezuela is between city and country. Caracas and Maracaibo, and certain parts of Valencia and Maracay, have some of the characteristics of cosmopolitan

cities. The concentration of wealth and the importation of ideas from Europe and North America by foreigners and by the upper-class Venezuelans have combined to produce in these urban centers certain features which are essentially foreign. For example, while the Avenida del Paraíso in the suburbs of Caracas, with its beautiful palms and magnificent homes, is traditionally Venezuelan, the new country clubs and golf courses of both Caracas and Maracaibo are "importations" from another society. The paved automobile highway is another exotic feature, and the extent to which it is an importation and not a native development can be seen in its entire lack of connection with the ordinary roads and trails of the country. The new and modern hotels in Caracas and Maracay are definitely importations. Today Caracas, Valencia, and Maracay have cotton textile factories, breweries, shoe factories, dairy plants, and slaughter houses—all of them sell in a domestic market which is largely urban and which is carefully protected by tariff barriers.

Underneath these surface contrasts there is a deep-seated clash of ideas. The people whose lives include the use of country clubs and golf courses are in a fundamental social sense different from those whose chief recreational activity outside of the home consists in the Sunday promenade on the Avenida del Paraíso. The cities exhibit the results of new ideas and new ways of living brought in by foreign engineers and commercial agents, by foreign tourists now coming in increasing numbers to Caracas, and by wealthy Venezuelans who have traveled and lived abroad. In the last two decades during which these urban changes have appeared in Venezuela the gulf between urban and rural, between exotic and indigenous, has widened and deepened.

In addition, there are other significant contrasts within Venezuela. The material prosperity produced by foreign capital is a striking feature of the oil fields. Not only was the revenue of the government increased many times, but since 1934 the share of oil and oil products in the exports of Venezuela has remained above 90 per cent. In 1938 Venezuela produced 79 per cent of the oil exported from Latin America. Oil revenues rescued the Venezuelan government from respectable poverty and gave it opulence, but this did not greatly affect the majority of the Venezuelan people. Not many more than 25,000 are employed in the petroleum and mining industries. Still Venezuela remains a country which is predominantly agricultural and pastoral, and the majority of its people still have very low incomes, even by Venezuelan standards. It is reported that the rural Venezuelan eats, on the average, about one quarter the amount of food which a normal European immigrant would require.

The differences between one region and another in density of population and in the nature of the economic life are not static. During the several centuries of Venezuelan history certain communities have been created by a new form of economic activity only to suffer a slow decline when that form of activity was no longer profitable. This sequence of rise and decline appears not only in mining communities, but also in settlements based on commercial agriculture—such as the planting of indigo. Population concentrations today based on such commodities as coffee, cacao, and sugar cane can scarcely be expected to show a greater permanence or stability, especially in view of the notable uncertainty of the international markets for these products. Even that "backlog" of Venezuelan economy, the cattle industry, has suffered major fluctuations within the last century. The program of colonization by foreign immigrants started just before the outbreak of the Second World War has been retarded by the international situation, although it may become important again when peace is re-established.

The clusters of people who call themselves Venezuelans are, with the exception of those in one border area, clearly separated from the people of other nationalities. Furthermore, the sentiment of nationalism is strongest in the nuclear zone around the national capital, and, in general, weakens as one goes to more remote districts. Most of the boundaries of Venezuela pass through empty country. Those which mark its separation from British Guiana and Brazil were drawn across unmapped territory, and only now are boundary commissions at work attempting to locate the actual line of separation. The boundary with Colombia also passes through thinly peopled country in the Llanos and along the mountain range west of Lake Maracaibo. Only where the boundary crosses the Andes separating the community around San Cristóbal from the community around Cúcuta is it drawn through a region of concentrated settlement—only here are people who call themselves Venezuelans in actual contact with foreign neighbors. Yet in this district the national boundary has not become a serious obstacle to trade: fairs held in San Cristóbal are regularly attended by many people from the Colombian side of the border; and the coffee from Cúcuta is exported each year through the Venezuelan port of Maracaibo. The remote Indian and mestizo farmers of the Andes have not yet learned to take seriously such distinctions as are imposed by international boundaries. National sentiment grows weaker as one draws away from the urban centers.

Bolívar understood well the diversity of his people. He knew that the mestizos of the highland basins would produce many a sincere ideal-

ist, many a poet and writer, many a lover of liberty, and many a cruel and aggressive tyrant. Well he knew that the genial and civilized life of the few would long be based on the labor and poverty of the many. He discovered, to his sorrow, that no social or political idea was great enough to hold together the diverse groups of his country. Only a strong dictator, supported by a well-paid army, could guarantee the internal peace necessary for economic advance. Gómez, the successor of a long line of able and less able dictators, had given his country peace and stability, even before the development of the oil resources. But Bolívar could not have foreseen that foreigners would pay tribute to the country for the right to carry away a wealth of liquid gold, and that the strength of the central authority then in power would, by that process, be enormously fortified.

3

REPÚBLICA DE COLOMBIA

Total area, 439,828 square miles

Total population, 8,701,816

Capital city, Bogotá; population, 330,312

Trade per capita:

- Imports: $10.27
- Exports: $10.87

Unit of currency, peso ($.57, gold content value)

Major commercial products in order of value:

- coffee
- petroleum
- gold
- bananas
- hides and skins
- platinum

Railroad mileage, 1,918

(The above statistics are for the year 1938.)

3

COLOMBIA

COLOMBIA is the country which occupies the northwest corner of South America, where the great mountain system of the Andes as it approaches the Caribbean is frayed into parallel cordilleras separated by deep longitudinal depressions. Only the western third of the Colombian national territory lies within the region of mountains and valleys; but within this third there are more different kinds of land than are to be found in any comparable area in South America. There are giant peaks and ranges so high that their summits are permanently white with snow; there are high basins where the air is always chilly; there are forest-clad slopes where the tropical showers feed torrential rivers; and there are lowlands, alternately baked in the tropical sun and drenched with violent rains, where the air is always warm and humid. This western third of Colombia is the part in which almost all the Colombians live. The eastern two thirds, which is mostly outside the effective national territory, is composed of a portion of the Guiana Highlands, a portion of the Orinoco Plains, and even a small bit of the Amazon Plain (Map 6). Such is the variety of terrain, of cordilleras and intermont basins, of lowland plains, of towering heights and swampy lowlands, into which this country is divided.

The diversity of western highland Colombia is not solely a matter of mountainous terrain and varied climates. It is also a matter of diverse people. There are fourteen distinct areas of concentrated settlement which differ from each other not only because of differences of the land,

but also because of differences between the people and their forms of economy. There are districts occupied by a mestizo people, not unlike the inhabitants of the highlands of Venezuela; there is one district where most of the inhabitants are pure or nearly pure Indian, not unlike the people of highland Ecuador; there are districts where Negroes predominate; and there is a district where Europeans have remained essentially unmixed with either Indians or Negroes. The long course of Colombia's history of settlement provides many opportunities to illustrate the importance of people and culture in determining the habitability of different kinds of land.

That this state should stand today among the few Latin American nations which have come close to the establishment of an ordered political and social life relatively free from the dictation of a strong central authority is a remarkable fact. The diversity of habitats, the many different kinds of people, and the great contrasts of economic interests and attitudes would seem to lead toward chaos and internal disintegration; but in spite of these conditions the Colombians have succeeded, after a stormy past, in coming within reach of Bolívar's ideal of a free people. Colombia is one of the few political units of all Latin America which, because of its political and social coherence, deserves to be called a nation.

The major features of the Colombian land are boldly marked (Maps 16, 17, and 21). Four great ranges of mountains, separated by deep longitudinal valleys, run north and south. Along the Pacific coast between Panamá and Buenaventura lies the Serranía de Baudó, a range which belongs geologically to Central America. On the east this range is bordered by a broad lowland extending from the Caribbean to the Pacific, drained in the north by the Río Atrato and in the south by the Río San Juan (Map 16). East of this lowland, and bordering the Pacific south of Buenaventura, is the *Cordillera Occidental*, or western cordillera. Still farther to the east is the highest of the Colombian ranges, the *Cordillera Central*, also known as the *Cordillera del Quindío*. From the border of Ecuador to a point a little north of the latitude of Buenaventura the Cordillera Occidental and the Cordillera Central are separated by a wide structural depression, a rift valley, drained in the south by the Río Patía (Map 21), and in the north by the Río Cauca (Map 16). From the northern end of this trench the Cauca makes its way toward the Caribbean through a series of profound gorges cut through the very rugged but not very high country where the Cordillera Central and the Cordillera Occidental are joined. The Cordillera Central is the easternmost of the Colombian ranges between the border of Ecuador and approximately latitude 2° north

of the equator. Here the eastern cordillera, or *Cordillera Oriental*, has its beginning. This wide cordillera continues northward and northeastward into Venezuela. About latitude 7° N. it separates into two branches, one forming the western rim of the Maracaibo Lowland, the other the southern rim. Between the Cordillera Oriental and the Cordillera Central is the deep structural valley drained by the Río Magdalena—a lowland which merges at its northern end with the lowlands along the coast of the Caribbean. Another individual mountain group, the Sierra Nevada de Santa Marta, stands prominently on the eastern edge of the Caribbean lowlands and towers above the Caribbean itself. This mountain group is separated from the end of the Cordillera Oriental by the structural depression drained by the Río César.

THE COLOMBIAN PEOPLE

The people who occupy this exceptionally diverse terrain are of European, Indian, and Negro ancestry. Estimates of the proportions of these ingredients are little more than informed guesses. Perhaps 10 per cent of the total population is of unmixed European ancestry. Although the Colombian census of 1938 counts only 60,000 pure Indians, the number of Indians who are nearly pure-blooded and who continue to live much as did their ancestors amounts to perhaps another 10 per cent of the total population. About 30 per cent is Negro and various Negro mixtures with both Europeans and Indians. Approximately half the population is mestizo. But these estimates can be quite misleading regarding the real mixture of people in Colombia, for within the three chief racial groups there are many strongly contrasted varieties, and the racial proportions differ widely from one part of the country to another.

The Native Indians

Before the European discovery of America the territory which is now Colombia was occupied by Indians of many different cultures. There were tribes whose way of living can be described as primitive, since it included very little choice in the manner of making a living and included little knowledge of the arts. But there was one group of tribes with a culture almost as advanced as that of the great Indian civilizations of Peru and Mexico. The Indians with the most advanced or complex way of living were the *Chibchas*, a sedentary agricultural people who occupied the high basins of the Cordillera Oriental (Map 4). In this remote mountain region the Chibchas had been brought together politi-

cally under the leadership of two chiefs—the *Zipa* whose capital was near the present city of Bogotá, and the *Zaque* whose capital was on the site of the modern city of Tunja. The political ability of the Chibchas of this region of high basins was far superior to that of any of the other tribes in Colombia. The Chibchas of the highlands were superior to other Colombian tribes whose language was so closely related to theirs that anthropologists commonly group them together. Like most of the highland Indians of America, all the Chibcha tribes were dependent on the basic food staples, maize and potatoes; and also like the other highland Indians from Mexico to Chile, the Chibchas had no concept of private property in land. These Indians had established fixed settlements, and in places favorable to their form of agriculture the density of population was comparable to that of highland Mexico and Peru.

The Indians who occupied the Cordillera Central and the Cauca Valley are included in the general Chibcha group; yet in many ways they were distinct from the highland Chibchas of the Cordillera Oriental. Politically they were much less advanced: in the vicinity of Cartago, for example, the Spaniards found the Indians living under the rule of more than sixty petty chieftains. On the other hand, the Indians of this part of Colombia were more advanced than the highland Chibchas in their technique of pottery making and their knowledge of metallurgy. Since gold was plentiful in the territory they occupied, they were especially skilled in the use of this metal and of alloys of gold with silver and with copper. The tribes of the Cauca Region fed themselves chiefly by hunting and fishing, but they supplemented their diet with maize, manioc, and yams. They also planted cotton, and made cotton textiles.

As anthropological studies progress, a greater and greater variety of Indian cultures is described. Yet increased detail does not obscure two fundamental facts important in our attempt to understand the distribution of people. First is the fact that only the Chibchas of the eastern highlands had become sedentary farmers, cultivating the same land year after year. The other tribes were either migratory hunters and fishers, or shifting cultivators—that is, people whose villages were more or less fixed in position, but whose croplands were temporary. Densities of population comparable to those of Mexico and Peru were found only in the areas of sedentary settlement; the other parts of Colombia were very sparsely populated. Secondly is the fact that none of the peoples of Colombia possessed domestic animals, except the dog. The result was that for these Indians many of the lands now utilized for pastoral activities were quite uninhabitable.

The European Conquest

A result of the Spanish conquest of Colombia was a great increase both in the area that could be used for human habitation, and in the variety of land use. The Spaniards brought with them cattle, horses, and sheep; they introduced wheat, barley, and sugar cane, and a number of farm practices previously unknown to the natives. These importations increased the agricultural productivity of the high basins because the European grains gave better yields at these altitudes than did the Indian maize, and domestic animals made possible the spread of settlement above the upper limit of the potato into the lands which had previously been considered uninhabitable.

The first Spanish settlements in Colombia were along the Caribbean Coast. Balboa founded a colony on the shores of the gulf of Darien which was perhaps the first European settlement on the continent, though the place was abandoned after a few years. The oldest surviving Spanish colonies are Santa Marta (founded in 1525), and Cartagena (founded in 1533). The first expeditions to enter the highland country to the south were organized to search for the mineral wealth which the stories of El Dorado had magnified. When the Spaniards discovered in the eastern highlands the relatively dense populations of sedentary peaceful Indians, they were surprised and delighted, for here, they soon realized, was the chief wealth of the country—Indians to work on the land or in the mines, Indians to be converted to Christianity.

Many writers assert that the Spaniards climbed into the mountains in order to escape from the heat of the lowlands: but the real incentives seem rather to have been gold and dense Indian populations. There is little to suggest that the Spaniards were the kind of people to place comfort or ease of living before the attainment of these objectives. Where gold was to be found, there the Spaniards settled; but such settlements were in many cases temporary, as all gold-mining settlements are apt to be. Where sedentary Indians were found, there also the Spaniards settled; and these settlements were likely to be permanent because they were based on the exploitation of a stable supply of Indian labor. Bogotá was founded in 1538. It was located in the Basin of Cundinamarca in the remote fastnesses of the Cordillera Oriental, accessible only with great difficulty from the coast, but easily accessible to the largest single area of densely concentrated native peoples. Bogotá, center of economic life in the colonial period, became, and still remains, the political center of Colombia.

The Spaniards entered from three directions (Map 5). 1. From Santa Marta expeditions ascended to the high basins of the Cordillera Oriental, and after the founding of Bogotá, other expeditions went northward along the Cordillera Oriental, and even pushed into the Sierra Nevada de Mérida in what is now Venezuela. 2. From Cartagena many Spaniards advanced southward into the Cauca Valley, where, between 1536 and 1540, they founded numerous small mining towns in localities where the stream gravels contained rich stores of gold. 3. Meanwhile a third group of Spaniards came northward from Peru by way of Quito, founding Pasto and Popayán in southern Colombia, and meeting the Spaniards from Cartagena in the latitude of Cali.

The Spanish conquest produced great changes in Colombia. The sedentary Chibchas soon learned to care for the white man's domestic animals and to cultivate the white man's grains. The Indians in the high basins became serfs attached to the large estates, owned by the officers of the conquering army; and new Indian communities were established in the Páramos—the high country above the upper limit of agriculture, but below the limit of permanent snow. In these higher regions the Indians remained predominant in numbers, but the wealth in terms of the European economy was accumulated by the new landowning aristocracy.

Meanwhile the more primitive Indians of other parts of Colombia were proving to be quite inadequate to meet the labor demands of the conquerors—whether in the placer mines or on the plantations where the new commercial crops, sugar cane and indigo, were cultivated. The native peoples were ravaged by imported diseases against which they had no immunity, and were unable easily to adapt themselves to the hard work demanded by the Spaniards. By the end of the first century after the conquest the more primitive tribes of Colombia had either been wiped out by epidemics or had withdrawn to the remote selvas of the Pacific slope. The Spaniards, therefore, resorted to Negro slaves, and Negroes came, in the course of time, greatly to outnumber the whites in certain parts of the lowlands.

Development of Colombia since the Conquest

By 1770 Colombia had a population of about 800,000. A century later the population had grown, chiefly by natural increase, to about 3,000,000. Well into the nineteenth century gold remained the chief economic interest of the ruling group, and even today Colombia is one

of the leading gold producing countries of Latin America. Yet during all this time most of the people of Colombia were engaged in agriculture and not in mining. Maize was by far the leading crop, but commercial crops of sugar cane, tobacco, indigo, and cacao were also cultivated. During the second half of the nineteenth century, cinchona bark, the source of quinine, was gathered in the forests. These various economic activities suffered, before the Wars of Independence, from excessive taxation and trade restrictions imposed by the mother country, and, after independence, from the recurring internal conflicts which plagued the country.

The cultivation of coffee added an important factor to the economic life of Colombia. Not until after 1880 did the mild, high-grade coffee produced in the highlands begin to find a preferred place in the markets of Europe and North America. Little by little coffee came to be even more important than it was in Venezuela, and Colombia today is the world's second largest producer of this commodity. The spread of coffee planting in the tierra templada on slopes too steep for most other forms of agricultural use, brought increased productivity and a rapid growth of new settlement to parts of Colombia which had previously been of little economic importance.

In recent years Colombia has added still other products to its commercial economy. Platinum, bananas, and petroleum now help to increase the volume of trade; and each of these commodities has made possible a new kind of habitat in this remarkably diverse country.

THE PHYSICAL CHARACTER OF COLOMBIA

Fundamental to the diversity which characterizes Colombia is the rugged surface of the western third of the country, in which most of the people live. The spotty patterns of distribution of all the elements of the physical land come not only from differences of soil and degree of slope, but also from differences in the orientation of the slopes with relation to the sun and to the rain-bearing winds. Furthermore, the mountains are high enough to include all the various vertical zones from sea level to the zone of permanent snow.

Surface Features

The four ranges of the Colombian mountains include a variety of geologic structures and surface forms. The westernmost range, the Serranía de Baudó, is by far the lowest and the narrowest. The highest

NORTHWESTERN COLOMBIA
SURFACE CONFIGURATION
SCALE
0
100
MILES
SANTA MARTA
BARRANQUILLA
SIERRA NEVADA DE SANTA MARTA
CARTAGENA
CALAMAR
EL DIQUE
CARIBBEAN
SEA
RIO CESAR
SIERRA DE PERIJA
VENEZUELA
PANAMA
RIO SAN JORGE
PUERTO NACIONAL
OCAÑA
CUCUTA
PUERTO WILCHES
BUCARAMANGA
BARRANCABERMEJA
SERRANIA DE BAUDO
ATRATO
OCCIDENTAL
RIO PORCE
CENTRAL
MAGDALENA RIVER
ANTIOQUIA
RIO
MEDELLIN
PUERTO BERRIO
ORIENTAL
OCEAN
RIO
QUIBDO
CHIQUINQUIRA
TUNJA
SOGAMOSO
HONDA
MANIZALES
RIVER
CORDILLERA
CARTAGO
QUINDIO PASS
IBAGUE
BOGOTA
CORDILLERA
RIO SAN JUAN
CAUCA
CORDILLERA
GIRARDOT
VILLAVICENCIO
PACIFIC
BUENAVENTURA
CALI
PALMIRA
NEIVA
POPAYAN
78°
10°
6°
PLAIN
PLATEAU
INTERMONT BASINS
HILLS
ISTHMUS RANGES
ANDES
NORTHERN LIMIT OF ASH FILL

MAP 16

NORTHWESTERN COLOMBIA
0 50 100 Miles
Selva
Semideciduous forest
Scrub forest
Savanna.
Páramos
Swamp
Altitudes in Meters
Santa Marta
Barranquilla
Puerto Colombia
Cartagena
Calamar
5800
L. Maracaibo
Magdalena R.
Cucuta
215
Bucaramanga
1020
Atrato
Medellin
1540
Quibdo
40
Honda
229
Manizales
Cauca
5620
Bogota
2640
R. Meta
Girardot
326
Villavicencio
470
San Juan
Buenaventura
Cali
1005
Magdalena
Huila
5720
484
Salto
Popayan
1760
Raisz

MAP 17

summit is less than six thousand feet above sea level, but the intense erosion produced by the very heavy rainfall on sharply tilted layers of stratified rocks has resulted in a surface composed of steep slopes and sharply crested ridges. In spite of the low altitude, therefore, some of the most rugged country in all of Colombia is to be found along the coast north of Buenaventura. Nevertheless, the Serranía de Baudó is so narrow at one place, a little north of latitude 6° N., that when possible routes for an interocean canal were being studied, one plan was to dredge the Río Atrato and to cut an opening through the mountains at this narrow place (Maps 16 and 17).

The next two ranges to the east, the Cordillera Occidental and the Cordillera Central, are alike in their geologic structure, being composed of massive crystalline rocks. Together they form the western and eastern flanks of a great arch which extends south from the Caribbean Coastal Lowlands almost to the southern border of Ecuador. In Colombia both cordilleras have crests which remain unbroken by stream valleys except in the places where the Río Cauca has cut a way out to the north and the Río Patía one to the west. Otherwise the crests of the two ranges are the divides between the streams which rise on either side. Both these cordilleras lack larger intermont basins. There are, however, narrow, ribbon-like valley lowlands along some of the streams—for example, the lowland of the Río Cauca north of Cartago, on which is the city of Antioquia (Map 16). In these mountains there are places where the slopes are very steep and other places where they are less so, but there are few patches of level land.

The Cordillera Central is the highest of all the Colombian ranges. It extends like a wall for more than five hundred miles, forming a massive pedestal of crystalline rocks thirty to forty miles wide, above which rise several volcanic cones, with their snow-clad summits more than 18,000 feet above the sea. The Cordillera Occidental, on the other hand, is relatively low. Its summits are only about 10,000 feet in altitude, not high enough to reach the snow line, and between Cali and Buenaventura there is a pass which requires an ascent of only a little over 5,000 feet.

The Cordillera Occidental and the Cordillera Central are separated, south of Cartago, by a deep rift valley. Along the crest of the arch of crystalline rocks, the keystone, as it were, has broken into blocks and fallen, forming a depression which continues either as a valley lowland or as a series of high basins from Cartago in Colombia to Cuenca in Ecuador (Maps 16 and 21). Between Cartago and Cali the rift valley

is deepest—the valley floor is only about 2,300 feet above sea level. South of Cali, however, the valley is filled to great depths with ash dropped into it from the bordering volcanoes. In the southern part of the rift valley in Colombia, in the drainage area of the Río Patía, the floor is at an elevation of more than 8,000 feet.

East of the Cordillera Central lies the deep Magdalena Valley and beyond it the Cordillera Oriental. This range of mountains has a much more intricate surface pattern than the other ranges because of the nature of its geologic structure. It is composed of folded stratified rocks over a crystalline core. The eastern border of this cordillera and the ridges, valleys, and basins within the cordillera all show a marked alignment from northeast to southwest, parallel to the axes of the folds. The western margin of the Cordillera Oriental, on the other hand, borders the Magdalena Valley along a north-south line, formed by a series of faults which cut diagonally across the folds.

Within the Cordillera Oriental there are three chief groups of surface features. The highest crests, which form the first group are not continuous as in the Cordillera Central: there are many short ridges, arranged in echelon following the axes of the folds in a general northeast-southwest direction. Many of these crests are high enough to reach the zone of permanent snow, and some of them still have small glaciers, remnants of much larger ones which sculptured the high surfaces during the glacial period. The rivers rise in the snow fields and páramos and descend into the bordering high valleys and basins as mountain torrents.

The second group of surface features in the Cordillera Oriental is composed of the high basins of the central area around Bogotá. The streams, cutting headward into the heart of the range, have not yet extended their deep valleys into this central area. At an elevation of between eight and nine thousand feet above sea level there is a surface, of gentle gradient, forming three large intermont basins and a number of smaller basins and valleys. The margins of these basins are bordered by alluvial fans, where the mountain torrents descend from the snow fields and páramos; but after crossing the fans, the streams meander with sluggish currents through broad valleys, forming swamps and even lakes in the centers of the basins.

The deeply dissected lower slopes below the high basins make up the third group of surface features. As the streams reach the border between the basins and the dissected lower slopes they plunge over spectacular falls; in the well-known Falls of Tequendama, the Río Bogotá drops more than four hundred feet. The valleys in this part of the cordillera

are narrow and steep-sided; in only a few places do terrace remnants or small valley flats provide patches of level land.

The Magdalena Valley separates the folded Cordillera Oriental from the crystalline Cordillera Central. Its structural similarity to the Rhône Valley of France is striking, since both are the result of faulting along the margin between young folded mountains and older crystalline *massifs*. The Río Magdalena is barely navigable for shallow-draught boats as far as Neiva; with an interruption midway in its course, however, at the rapids at Honda. The valley is very deep, for even at the latitude of Girardot, some 460 miles from the Caribbean, it is scarcely 1,000 feet above sea level. Upstream from Girardot the slope of the valley bottom becomes greater; beyond Neiva the river is frequently interrupted by rapids.

The Caribbean Coastal Lowlands, formed in part by the alluvial deposits of the Magdalena and the Cauca, lie nestled in a rough triangle between the sea, the western base of the Sierra Nevada de Santa Marta, and the long descending spurs of the Cordillera Central and the Cordillera Occidental. Rows of low hills half buried in alluvium extend northward to the shores of the Caribbean.

The rest of Colombia is mostly outside the effective national territory. The very high Sierra Nevada de Santa Marta, the summits of which reach nineteen thousand feet, stands as an isolated block of mountains on the margin of the Caribbean. Beyond it is the Goajira Peninsula, composed of a platform of crystalline rocks with a few knobby hills standing above it. East of the Cordillera Oriental the northeastern part of Colombia includes a continuation of the Llanos of the Orinoco. Between the Llanos and the Plains of the Amazon, a westward projection of the Guiana Highlands reaches the base of the Andes south of Villavicencio (Maps 6 and 16). All these regions are thinly populated, in some cases by Indian tribes which are independent of any political control by the Colombians.

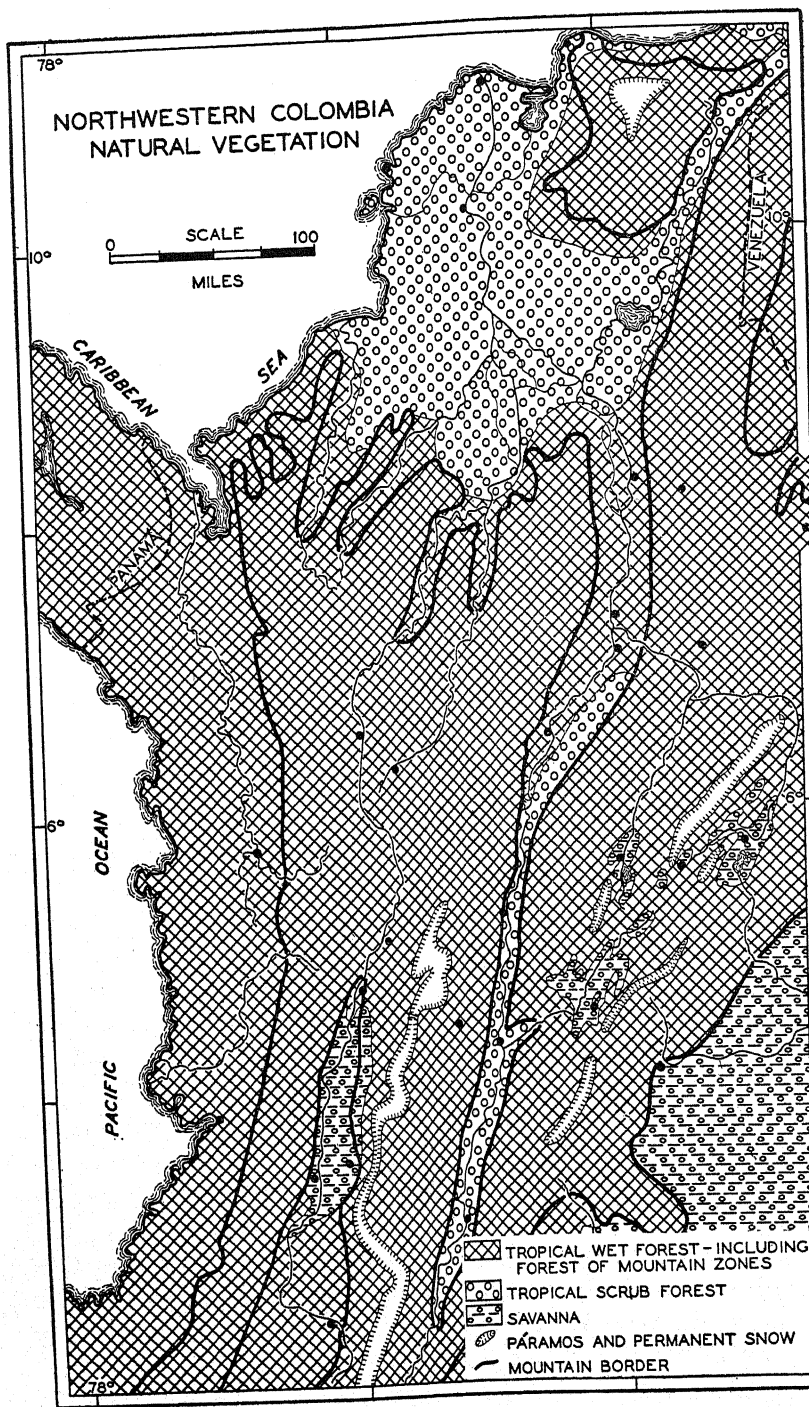
Vertical Arrangement of the Climates

In such a mountainous country as Highland Colombia the climatic conditions and the natural vegetation which reflects these conditions present a most intricate pattern. Variations in exposure to the sun, variations in hours of sunlight, and sharp differences in rainfall within small areas are characteristic. In general, however, all this intricacy of detail resolves itself into broad vertical zones, which are especially discernible when one of the mountain ranges is viewed from a distance.

Vertical zoning has more meaning in terms of human settlement in Colombia than in any other part of Latin America. Three principal facts account for this. In the first place, the Colombian Andes are near the equator and are high enough to reach the snow line. This permits the maximum possible amount of vertical differentiation, for as the snow line descends in higher latitudes so also do the other altitude limits. But not all low-latitude mountain regions include basins, level-floored valleys, or areas of gentle slopes within the different altitude zones. In the Sierra Nevada de Mérida in Venezuela, for example, most of the basins and valleys are less than 6,000 feet above sea level; although the higher zones exist in these mountains, they are not occupied by dense clusters of people. The second principal fact is that in Colombia areas of relatively gentle slope are to be found at various elevations from sea level up to the snow line. Finally, the Colombian Andes are occupied by a European people whose many different ways of gaining a living make possible the use of lands at all altitudes.

The vertical zones are similar to those of the Sierra Nevada de Mérida in Venezuela. The tierra caliente has a general upper limit of about 3,000 feet. The tierra templada, or zone of coffee, lies between 3,000 and 6,500 feet. The tierra fría extends from 6,500 to a little over 10,000 feet. Above the tierra fría are the treeless páramos, which extend to the snow line at about 15,000 feet above the sea.

A very common and often repeated error is to think of the high-altitude climates of the tropics as similar to the climates with the same average temperatures which are found at sea level in the middle latitudes. Many writers on Colombia have stated that by ascending to the tierra fría one reaches temperatures comparable to those of climates much farther from the equator. This is true if we consider average annual temperatures only; but it is far from true if we consider seasonal variation of temperature or variety of weather. In the tropical regions, even at sea level, the range of temperature between the average of the warmest month and the average of the coldest month is only about three or four degrees. As one ascends the mountains the ranges of temperature become less. At Bogotá, 8,727 feet above sea level, the average annual temperature is 58.1°—exactly the same as the average annual temperature of Knoxville, Tennessee; but in Bogotá the difference between the averages of the warmest and the coldest months is only 1.8°, while the difference at Knoxville is 38.1°. To describe Bogotá as having a "perpetual spring climate," as is so frequently done, is to create a very false impression, for there is none of the weather variety characteristic of a midlatitude spring.

NORTHWESTERN COLOMBIA
NATURAL VEGETATION
SCALE
0
100
MILES
78°
10°
6°
CARIBBEAN
SEA
PANAMA
VENEZUELA
PACIFIC
OCEAN
TROPICAL WET FOREST - INCLUDING FOREST OF MOUNTAIN ZONES
TROPICAL SCRUB FOREST
SAVANNA
PÁRAMOS AND PERMANENT SNOW
MOUNTAIN BORDER

Map 18

The Regions of Settlement. The different kinds of people who occupy these different kinds of lands are concentrated in fourteen separate areas. Furthermore, the relation between the concentrations of settlement and the major political divisions of Colombia, the so-called "departments," is a simple one (Maps 20 and 23). Only two of the fourteen departments are occupied by more than one cluster of people; and only two of the clusters spread across department borders. Otherwise each department has a core of densely occupied land, and the boundaries pass through the sparsely settled territory between neighboring areas of concentration. In order to simplify the discussion of these fourteen areas of settlement, they are grouped under six major headings as follows:

I. The high basins of the Cordillera Oriental
 - Cundinamarca (one of the two clusters)
 - Boyacá (two clusters)

II. The valleys at lower altitudes
 - Santander
 - Norte de Santander
 - Cundinamarca (one of the two clusters)
 - Huila
 - Tolima

III. The Antioquia Region
 - Antioquia and Caldas

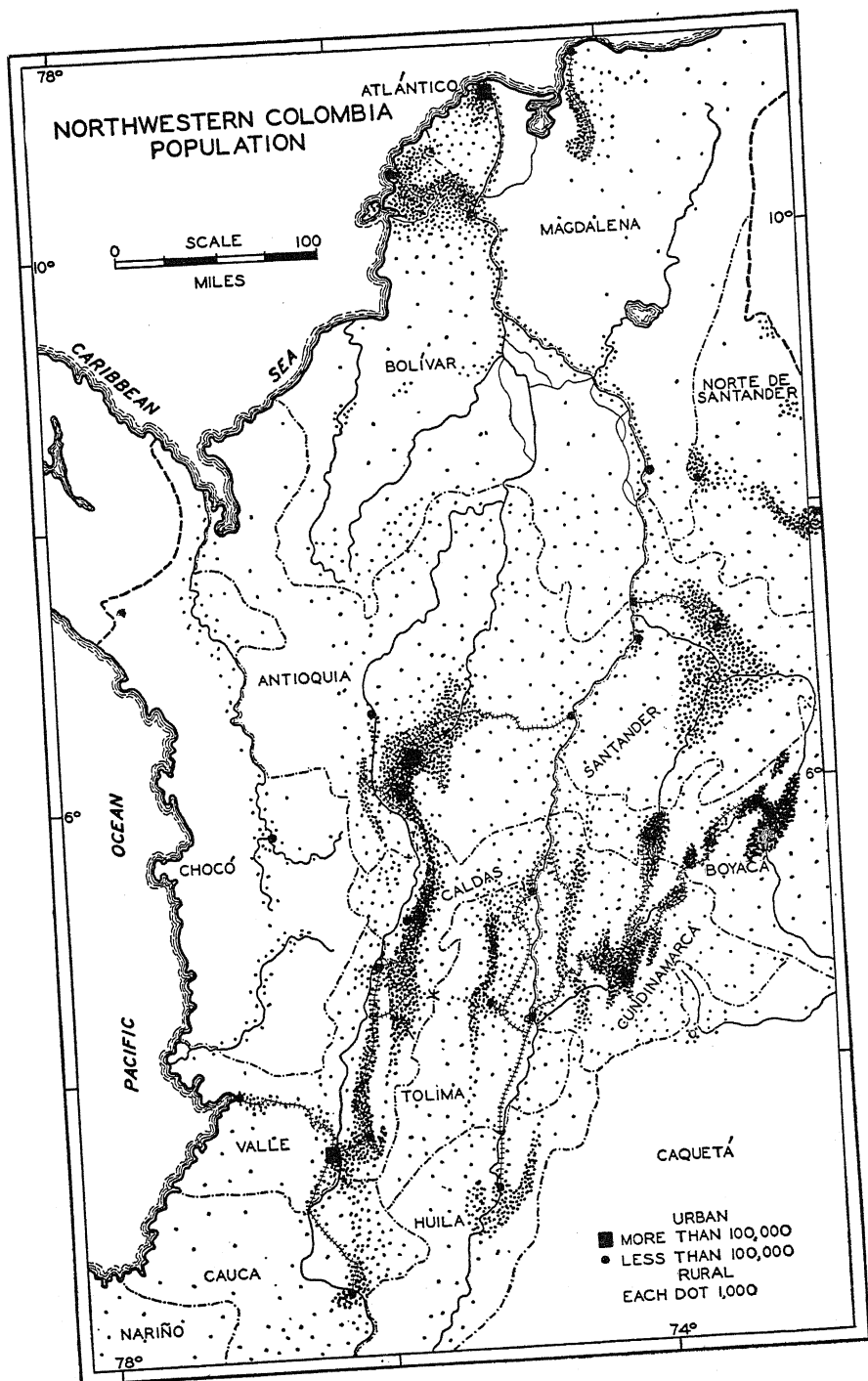
IV. The Cauca Valley
 - Cauca and Valle

V. The Pasto Region
 - Nariño

VI. The Caribbean Coastal Lowlands
 - Bolívar
 - Magdalena
 - Atlántico

I. THE HIGH BASINS OF THE CORDILLERA ORIENTAL

The high basins of the central, headwater area in the Cordillera Oriental are among the most densely populated parts of Colombia. There are three chief clusters of people, occupying the three chief basins (Maps 16 and 20): one of the clusters is in the Department of Cundinamarca and two are located to the north of Cundinamarca in the Department of Boyacá. The urban center of the largest cluster, the one in Cundinamarca, is the

NORTHWESTERN COLOMBIA
POPULATION
SCALE
0
100
MILES
78°
10°
6°
74°
CARIBBEAN
SEA
PACIFIC
OCEAN
ATLÁNTICO
MAGDALENA
BOLÍVAR
NORTE DE
SANTANDER
ANTIOQUIA
SANTANDER
CHOCÓ
CALDAS
BOYACÁ
CUNDINAMARCA
TOLIMA
VALLE
CAQUETÁ
HUILA
CAUCA
NARIÑO
URBAN
MORE THAN 100,000
LESS THAN 100,000
RURAL
EACH DOT 1,000

MAP 20

city of Bogotá, capital of Colombia, a city which has become much more than the center of this one area of settlement for it is now the political, social, and artistic, if not the economic, focus of the whole nation. The urban centers of the two areas of dense settlement in Boyacá are Chiquinquirá and Sogamoso. The political center of the large Department of Boyacá, however, is Tunja, which is situated in a smaller basin midway between the two larger ones (Map 16). The rural population of this whole central region of the Cordillera Oriental is between 25 and 60 per square mile, with a few areas of more than 60. Bogotá, now much larger than the economic activity of its immediate surroundings would justify, is a city of 331,400 people.

When the Spaniards first invaded the Cordillera Oriental they found the high intermont basins occupied by a relatively dense population of Chibchas. The different tribes in the Basin of Cundinamarca had been united under the leadership of the Zipa. But the páramos (Map 18) between Cundinamarca and the neighboring basins were quite uninhabitable so far as the Indians were concerned, and political authority had not been extended across to the territory of the Zaque. The Chibchas were sedentary agricultural Indians who offered the conquerors a source of abundant and inexpensive labor. In 1538 the Spaniards founded the town of Bogotá on the slopes of the alluvial fan overlooking the Basin of Cundinamarca. The basin itself, together with much of the surrounding high country, was promptly divided into large estates on which the Indian communities remained as the chief source of wealth for the owners.

The major economic activity of the high basins is still the production of food. Emerald mines, located a little southwest of Chiquinquirá, and various localities (Zipaquirá, Nemocón, and Sesquile) where salt was mined before the arrival of the Spaniards remained active after the conquest. Gold was not found in any abundance in the Cordillera Oriental, and mining operations as a whole were never of great importance in this region. In the present century the emerald mines have been worked only periodically. The Europeans, however, extended the area of habitable land and increased the food-producing capacity of the land already inhabited, by the introduction of wheat, barley, and cattle. Maize, the grain used by the Indians, can be cultivated up to an elevation of 8,850 feet; and, as in the Sierra Nevada de Mérida in Venezuela, it can be harvested twice a year—the first and largest harvest coming in August, and the second and less certain harvest in December. Wheat is now grown up to 9,800 feet, and barley and potatoes up to about 10,500 feet. The páramos are utilized for pasture (Map 19).

The Basin of Cundinamarca, as well as the neighboring basins, is now more densely populated than in the period before the conquest. Green pastures and fields of ripening crops are bordered by rows of willows and eucalyptus trees following the property lines and the roads; small villages are scattered widely over the basin floors and the bordering alluvial fans. The mestizos and Indians who make up the majority of the rural people are still primarily subsistence farmers, although the exchange of small surpluses for the products of the lowlands creates a significant movement of trade up and down the mountain trails.

Bogotá, the urban center of Cundinamarca, stands in striking contrast to the territory which surrounds it. In spite of the difficulty of reaching it from other parts of the country, in Bogotá are gathered many elements of the national life which come from far beyond the borders of the department; to it come not only political leaders from all parts of the country, but also writers, artists, social leaders, and students. It is with justice that Bogotá is frequently called the "Athens of America." Its cosmopolitan atmosphere, its large proportion of people of European origin, as well as its beautiful buildings, combine to set it off sharply from rural Cundinamarca. But Bogotá is not the center of the *economic* life of Colombia.

II. THE VALLEYS AT LOWER ALTITUDES

Five of the fourteen clusters of people in Colombia have become established in the valleys at lower altitudes in the Cordillera Oriental and on the eastern slopes of the Cordillera Central (Map 20, and the outline on p. 94). This part of Colombia, together with the Magdalena Valley which passes through its center, was thinly populated by relatively primitive Indians before the arrival of the Spaniards. Therefore, although the intermediate altitudes were more comfortable than the continuously cool highlands, the main course of Spanish settlement was directed to the areas already occupied by large groups of sedentary Indians. After the towns of the high basins had been established and the surrounding highlands had been divided among the conquerors, the less attractive and the more remote places were occupied. European settlement extended only a short distance south of Bogotá in the Cordillera Oriental; but toward the north, wherever the slopes made possible the cultivation of crops, settlement was undertaken. The chief concentrations developed in five places at the lower altitudes: around Bucaramanga in Santander; around Cúcuta in Norte de Santander, with a very minor group

around Ocaña; on the lower slopes of the Cordillera Oriental in the Department of Cundinamarca; on the opposite side of the Magdalena Valley on the lower east-facing slopes of the Cordillera Central in the Department of Tolima, centering on Ibagué; and farther south around Neiva, in the Department of Huila.

The Settlements of Santander

The big movement of European population into the northern part of the Cordillera Oriental took place in the nineteenth century. Since this region contained little gold, and since the wealth-producing crops—sugar, cacao, indigo, and cotton—could scarcely compete with the products of better favored areas near by, Santander and Norte de Santander remained of small importance during most of the colonial period. Between 1860 and 1885, however, a resource was found in the forests of this region which could at last break down the barriers of isolation—this was the bark of the cinchona tree. For a time Bucaramanga became one of the chief collecting and shipping points for cinchona bark, and the population already in the region was re-enforced by a small number of Europeans and mestizos from other parts of the country. When the Javanese plantations of cinchona captured the market, there was neither enough capital nor enough labor available for the establishment of competing plantations in the Andes, the native habitat of cinchona.

A new commercial product, however, began to enter the export trade of Colombia soon after 1880. This was coffee—a crop which we have already seen occupying the steep mountain slopes in areas of sparse population in Venezuela. Coffee, which came at least indirectly from Java, more than compensated for the loss of the cinchona trade to Java. Today, coffee is grown on many of the mountain slopes around Bucaramanga (Map 19), where the work is done by tenants on large estates. The present population of this district includes a higher proportion of Europeans or near-Europeans than does the population of the high basins where the Chibchas were already occupying the land effectively before the arrival of the Spaniards.

Production in the Bucaramanga district has now been diversified by the establishment of plantations of cacao, tobacco, and cotton below the zone of coffee. In the town of Bucaramanga there are textile factories and establishments for the manufacture of straw hats, industries which are based on small but dependable supplies of local raw materials. The markets for these products are found throughout Colombia; goods are

shipped in and out between Bucaramanga and the Magdalena Valley by rail.

The Settlements of Norte de Santander

The story of the settlement of the valleys of Norte de Santander around Cúcuta and Ocaña is similar to that of the European occupation of Santander, except that the isolation of the northern department is even greater than that of the southern one. The deep dissection of this part of the Cordillera Oriental has produced a surface so rugged that transportation between Bucaramanga, Ocaña, and Cúcuta has been carried on with great difficulty. Ocaña can be reached, even today, only by a rough trail, passable for oxcarts, which connects it with the Magdalena Valley. Cúcuta found its easiest outlet northeastward across the Maracaibo Lowlands in Venezuelan territory. A railroad line was built from Cúcuta to a navigable river which flows into Lake Maracaibo. In both Ocaña and Cúcuta the products which have paid for these connections with the rest of the world, such as they are, were first cinchona and later coffee.

In recent years, however, an oil field in Norte de Santander, located in the southwestern corner of the Maracaibo Lowlands, has been opened up by a North American company. Machinery for the drilling of wells and for other construction was brought in by airplane. In 1939 a road, passable for automobiles, was built from the Magdalena Valley across this rugged terrain to the Maracaibo Lowlands north of Cúcuta, and a pipe line, 263 miles long, brings the oil to a small port on the Caribbean Coast south of Cartagena. This expensive road will no doubt provide a new route of access to Cúcuta.

The Three Settlements Bordering the Magdalena Valley

Since the introduction of coffee as a commercial crop three other areas of concentrated settlement have appeared on the lower mountain slopes bordering the Magdalena Valley. They are located in the Departments of Cundinamarca, Tolima, and Huila (Map 20). The plantations in Cundinamarca overlook that part of the valley between Honda and Girardot (Maps 16 and 19). On the opposite side of the valley, on the lower slopes of the Cordillera Central, the department of Tolima also includes a small area where coffee plantations have been established along the old colonial road connecting Honda with Ibagué. The third area of settlement on the borders of the Magdalena Valley begins on the lower slopes of the Cordillera Oriental a short distance upstream from Girardot, and

touches the Magdalena at Neiva in the Department of Huila, where the valley bottom is high enough to reach the zone of coffee. In all these areas the plantations are on large estates, and the work is done by tenants and hired laborers. The people are mestizo and pure European.

III. THE ANTIOQUIA REGION

One of the most important clusters of people in Colombia is in the Antioquia Region, in the Departments of Antioquia and Caldas (Map 20). The central nucleus of this area of concentrated settlement is the city of Medellín, located in a small valley lowland about four thousand feet in altitude in the Cordillera Central (Map 16). The colonial gold-mining town of Antioquia located in the lowland along the Río Cauca is today a place of small importance and should not be confused with the department of the same name. The people in the Departments of Antioquia and Caldas—which we designate as the Antioquia Region—not only have assumed leadership in the economic life of Colombia, but also, as a result of their high birth rate, have been able to expand the frontiers of their original settlement around Medellín and to send out new colonies without decreasing the density of the original nucleus. The Antioquia Region merits close attention not only as one of the diverse elements in the Colombian scene, but also as one of the four places in the whole of mainland Latin America where expansion has taken place without a decline of the older settlements behind the frontier.

The Land

The Cordillera Central, in which Antioquia and Caldas are situated, is very different in its surface character from the Cordillera Oriental. There are no intermont basins at higher altitudes. At lower altitudes, however, there are a number of places where the valleys widen to enclose small ribbons of flat land along the streams. The largest area of this sort borders the Río Cauca where the town of Antioquia was established (Map 16); but there are many other smaller bits of valley lowland along the tributaries of the Cauca. Medellín was built in a valley basin which, extending for only about twelve miles along the Río Porce, is too small even to appear on the map (Map 16). Most of these small but important pieces of flat land are at elevations of between two and six thousand feet; and all of them are so isolated by steep valley sides and by narrow gorges upstream and downstream that access to them is not at all easy. Otherwise this is a region of steep slopes and very narrow valleys.

Vertical zones of climate and vegetation are recognized in the Cordillera Central as well as in the Cordillera Oriental. The tree line is about 11,500 feet above sea level. The páramos reach the lower limit of permanent snow at about 15,000 feet. On the western side of the cordillera, overlooking the Cauca Valley south of Cartago, the forests have a lower as well as an upper limit, for the savannas along the Cauca continue as pure grasslands onto the lower mountain slopes, covering the western side of the Cordillera Central to an elevation of between 5,000 and 6,500 feet. North of the latitude of Cartago, on the other hand, dense forests cover all the slopes down to the bottom of the deepest valley.

The Settlement of Antioquia

The first penetration of this rugged mountain country by Europeans was made by people from Cartagena. They advanced over steep slopes and through dense forests seeking for the gold which was believed to be plentiful in the stream gravels. They did discover a wealth of precious metals, and in 1541 they founded the town of Antioquia near the Río Cauca in the midst of placer mines. But for permanent settlement the region was handicapped, as far as the Spaniards of the colonial period were concerned, by the scanty Indian population and by the fact that these Indians could not adjust themselves as easily as did the sedentary Chibchas to the labor demands of the conquerors. Except for the mining centers, whose population increased or decreased with the fortunes of the gold seekers, there was little interest in this remote part of the Cordillera Central.

The present uniqueness of the Antioquia region was produced by the peculiarities of the settlement which took place a whole century later. During the seventeenth century, for reasons not fully known, a considerable group of new immigrants came to Colombia from Spain. They were made up in part of Basques, but also of numerous families of converted Jews, known as *cristianos nuevos*. The latter, especially, were seeking a place to settle which would provide a maximum of isolation and protection, and few places in the Andes offered better advantages of this sort than the hitherto sparsely occupied basins along the Río Porce. When, in 1675, these new settlers founded the town of Medellín they had selected a site which was very difficult to reach from the older centers of colonial life. The rugged and deeply dissected country that lies between Medellín and Cartagena is so difficult to cross that even to this day no important route of travel leads directly to the Caribbean—although

now an automobile road is planned. Medellín could be reached actually from two directions. A trail used mostly by mule trains connected Medellín with Cartago at the northern end of the broad Cauca Valley (Map 16), from which communications with the Pacific port of Buenaventura by way of Cali were relatively easy. But the most common route used for the very small trade in or out of Medellín was an oxcart road, 120 miles long, to Puerto Berrío on the Magdalena, crossing the Cordillera Central by a pass only 5,080 feet above sea level. Although Medellín soon replaced the older town of Antioquia as the chief center of the region, the people remained in isolation, largely self-sufficient. They exported only a little gold and silver which were still taken from stream gravels throughout the area.

The Antioqueños

Two characteristics of the descendants of these original settlers distinguish the people of Antioquia from others in the tropical mountain countries of Latin America. First is their extraordinary birth rate and force of expansion, previously mentioned. Second is the fact that these people have remained almost entirely unmixed with either Indians or Negroes, preserving, therefore, an almost pure European stock.

Why should these people, together with the settlers of Highland Costa Rica, have been the only groups in the mountains of tropical Latin America able to achieve such an effective form of settlement? In the case of the people of Antioquia was it perhaps the strong patriarchal tradition with its emphasis on family solidarity brought by the converted Jews? Yet people of this origin went elsewhere in Latin America without producing such striking results. Was it, perhaps, the establishment of a people with this patriarchal tradition in a locality so isolated that the group was not diluted by later immigrants before they were able to blend into a closely knit society with a notable unity of purpose and background? All these things merit a far more careful historical and geographical investigation than has yet been made.

The peculiar qualities of the Antioqueños, or people of Antioquia, are well known today throughout Colombia. Although they found themselves in a region with a small Indian population, they nevertheless resisted the importation of Negro slaves, even when their neighbors in the Cauca Valley were becoming wealthy on slave labor. So intense was the feeling on the Negro question that when, early in the nineteenth century, it was suggested that a second and more direct road be built to

connect Medellín with Cartago, the project was abandoned for fear that greater accessibility in this direction would result in an influx of people whom they considered undesirable. The Antioqueños performed their own manual labor and started their own retail business enterprises. Visitors who penetrated this part of Colombia in the nineteenth century described the inhabitants as an alert, virile, efficient people quite different from the light-hearted, more artistic, but certainly less businesslike Europeans of Cundinamarca. "To these energetic and efficient people," wrote a German traveler in 1880, "belongs the future of Colombia." (56) This same writer reported that the retail business in this region, unlike that of all the other parts of Colombia, had not fallen into the hands of Germans and Syrians, but was being carried on almost exclusively by Antioqueños. During the turbulent period which lasted from the collapse of Bolívar's "Greater Colombia" to the beginning of the First World War, the chief stronghold of the conservative party in Colombia was Antioquia, and these people set forth on numerous occasions to fight for their political ideals against the liberals of Cundinamarca.

Without its high birth rate, however, this isolated group of Europeans might have withered, or have achieved only local significance. The remarkably large families gradually made this region play a more and more important part in the life of the nation. Even at the present time families of fifteen or twenty children are not uncommon. Since the migration of the original settlers in the seventeenth century the Antioquia Region has not received any important numbers of new immigrants, yet since the beginning of the nineteenth century the settlements have been vigorously expanding.

The tendency to send out new colonies first appeared about 1800. This was long before coffee had entered the economic life of Colombia; it was at a time when the only exports from the region were gold and silver, and when the agriculture of the Antioqueños consisted in the shifting cultivation of maize, sugar cane, bananas, and beans for local subsistence. Expansion took place chiefly to the south of Medellín, following the forested intermediate slopes on the western side of the Cordillera Central. Manizales, about 75 miles south of Medellín, was founded in 1848; and in the second half of the century the rate of expansion continued to rise as many new towns were established south of Manizales, but well above the lowlands of the Cauca Valley. Expansion is still continuing southward, but the settlements of the Antioquia Region remain distinct from those of the valley, since they are separated by the zone of grasslands on the lower mountain slopes (Map 20).

The increase of population in Antioquia is extraordinary when we remember that it has not been supported by immigration. In 1808 there were some 106,000 people in the Department; by 1884 the number had increased to 463,000; and by 1918 the two Departments of Antioquia and Caldas, into which the original political unit had been divided, numbered 1,200,000 inhabitants. Today, these two Departments have nearly 2,000,000 inhabitants. Medellín, which had 88,000 in 1924, is now a city of over 170,000; and even Manizales, less than a century old, has more than 86,000 inhabitants.

Transformation of Antioquia

The introduction of coffee cultivation into Antioquia was a part of a transformation in the economic life of the region. Although the new crop appeared in the Magdalena Valley about 1865, and entered the export trade of Colombia shortly after 1880, it was slow in penetrating the carefully guarded isolation of Antioquia. Even as late as 1880 the Antioqueños were still carrying on a shifting cultivation of food crops for local consumption. But during the First World War and the decade which followed, the Antioqueños suddenly embraced a new economic life. There are few large estates in this region; in contrast to the system in other coffee-producing regions of Colombia, in Antioquia there are small properties with resident owners who do their own work. In the short span of two decades these small proprietors changed from the production of subsistence food crops to the planting of coffee. In Medellín, textile factories were built. The cotton they use is produced outside of Antioquia, and at least part of the manufactured product is sold outside of the region. Isolation is a thing of the past; in an incredibly short time Antioquia has been transformed from a self-sufficient area to one intimately linked with foreign markets; Medellín has emerged from obscurity to become the chief center of the economic life of the nation.

Lines of Circulation

These changes in the economic activities involved an elaboration of the routes of circulation. Formerly Antioquia could be reached only from Puerto Berrío and from Cartago. Except for the road from Puerto Berrío to Medellín the only other route over the Cordillera Central in this part of Colombia was the trail from Ibagué to Palmira over the Quindío Pass, a line of travel which led to the Cauca Valley and thence southward, rather than to Antioquia. Now the Antioqueños have expanded south-

ward along the western slopes of the Cordillera Central until their farthest pioneer clearings are south of the Quindío road. Several new mule trails over the Cordillera connect these settlements with the Magdalena Valley. Manizales has established its connections over the Cordillera Central by means of a cable line which reaches a railroad station near Honda. Bags of coffee are transported on this cableway in one direction, and a variety of foodstuffs and manufactured articles are carried in the other direction.

Railroads have also penetrated the Antioquia Region. The line from Buenaventura to Cali and Palmira has been extended northward to Cartago; and, in recent years, it has been extended over rugged terrain to Manizales (Map 19). The chief outlet from Medellín, however, is still the traditional route to Puerto Berrío. For many years railroads were in operation on both sides of the pass, but the gap between them required an oxcart or muleback journey over the cordillera. Now a tunnel provides a connection all the way between the Magdalena and Medellín. No rail connection yet exists, however, between Medellín and Manizales.

The airplane and the radio, also, are facilitating the establishment of close contacts with the rest of the country and the outside world. The problem which is being studied today is how to overcome isolation, not how to preserve it.

IV. THE CAUCA VALLEY

The communities of Antioquia, then, form the most striking contrast with the settlements of other parts of Colombia. The predominantly European population of farmers who own and operate their small properties is entirely different from the population of Indian tenants on large estates which is characteristic of Cundinamarca and Boyacá; even with the other coffee-producing areas of Colombia the Antioquia Region is to be contrasted in terms of population and land tenure. None of these contrasts, however, is so sharp as those which differentiate Antioquia from the region bordering it on the south and west—the Cauca Valley.

The name "Cauca Valley" is applied to the northern three fifths of the structural depression which lies between the Cordillera Central and the Cordillera Occidental in Colombia (Map 16). Between Popayán on the south, where the Río Cauca emerges from the Cordillera Central, and Cartago on the north, where the Cauca plunges into its gorge, the rift valley is occupied by a relatively dense population. This cluster forms the center of two departments, Valle and Cauca (Map 20 and the outline on p. 94).

The Land

The Cauca Valley is notably different in the details of its surface in the north and in the south. Between Popayán and Cali the structural depression is filled with volcanic ash, and in this easily eroded material the Cauca has cut a deep canyon. Remnants of the undissected surface of the ash stand high above the river as flat or gently sloping terrace-like forms. Popayán itself is built on such a terrace, 5,500 feet above sea level and about 1,000 feet above the river. A short distance above Cali, however, the river emerges from the ash and thence, for about 125 miles to Cartago, it winds about on a wide floodplain. The elevation near Cali is about 2,300 feet. Here the lowland, with its floodplain and low terraces, is about 15 miles wide: the floodplain is close to the western border, and the eastern half of the valley is composed of terraces and alluvial fans built by the tributary streams from the high Cordillera Central.

Most of the Cauca Valley was originally covered with savanna (Map 18). Along the floodplain of the river the swamps are filled with bamboo interspersed with patches of dense evergreen broadleaf forests. Back from the floodplain, however, the terraces and alluvial fans were covered with tall, rank grass and scattered low trees. The rainfall which supports this vegetation is abundant, coming in two seasons—from March to May and from September to November.

Settlement in the Cauca Valley

The Spanish invaders who entered the Cauca Valley both from the north and from the south found little gold; but they did find a land suitable for the production of that new wealth-bringing commercial crop, sugar cane. The Indians, however, proved quite inadequate as a supply of labor. Diseases introduced by the white men killed great numbers of the natives. Nor were these tribes of the Cauca Region so ready to engage in agricultural work as the Chibchas of the central basins in Cundinamarca. Therefore the Spaniards soon brought in Negro slaves. The land was divided into large estates, some containing more than 2,500 acres; on the terraces and fans of the eastern side of the valley large areas of sugar cane were cultivated, and the Negro slaves were grouped in small villages scattered throughout the plantations.

After more than four hundred years of European settlement sugar cane is still the leading crop in the Cauca Region, although it is not the only one (Map 19). The methods followed both in the cultivation of the

fields and in the extraction of the juice from the cane remain so primitive that the yield per acre is very low; but since the Colombian planters sell almost entirely to a protected market there is no need to undertake a more intensive cultivation in order to decrease the unit costs. Meanwhile the northern end of the valley around Cartago has become famous for its plantations of cacao; and in the district around Palmira large acreages are devoted to tobacco. Numerous herds of cattle are pastured during the periods of low water on the wet meadows of the Cauca floodplain, and during the rainy seasons on the grass-covered lower western slopes of the Cordillera Central.

Cali and Popayán have played contrasting roles in the social and economic life of the Cauca Region. Here we discover a relationship similar to that developed between Valencia and Caracas, where the Spanish landowners, after establishing their plantations in areas warm enough and wet enough for the production of sugar, then selected for their own places of residence locations on higher ground where the air is cooler and where disease-carrying insects are fewer. Popayán became an aristocratic town, occupied very largely by people of unmixed European ancestry. Even the owners of the placer gold mines of Antioquia came to live in Popayán, leaving their mines, as the sugar planters left their estates, in the care of overseers. But Popayán is not a national capital like Caracas. It is still a predominantly European place, the home of many of Colombia's aristocratic families, a town rich with colonial tradition, but not a place of great economic significance in the modern era. Today, Popayán has only about 30,000 inhabitants.

Meanwhile Cali has become the chief commercial center of the valley. Located at the eastern end of the pass which leads over the Cordillera Occidental to the Pacific port of Buenaventura, Cali has become the focus of the lines of travel and of the business interests of the whole Cauca Region. In recent years the importance of this outlet, as compared with the outlet to the Magdalena Valley over the Quindío Pass, has been greatly increased by two events. A railroad connecting Cali with Buenaventura was started in 1878 and was finally completed in 1914. At this same time, the opening of the Panama Canal and the resulting concentration of people in the Canal Zone offered a new market, especially for the cattle of the Cauca Region. In 1912 Cali had a population of 27,000; by 1918 it had grown to 45,000; today, it is a city of more than 100,000. Buenaventura, with its new docks, is one of the few ports on the whole west coast of Latin America where ships do not have to use lighters in loading and unloading cargoes. Further increase in the con-

centration of economic activities in Cali and Buenaventura may be expected as a result of the automobile highway which now reaches Bogotá, and extends southward to Quito.

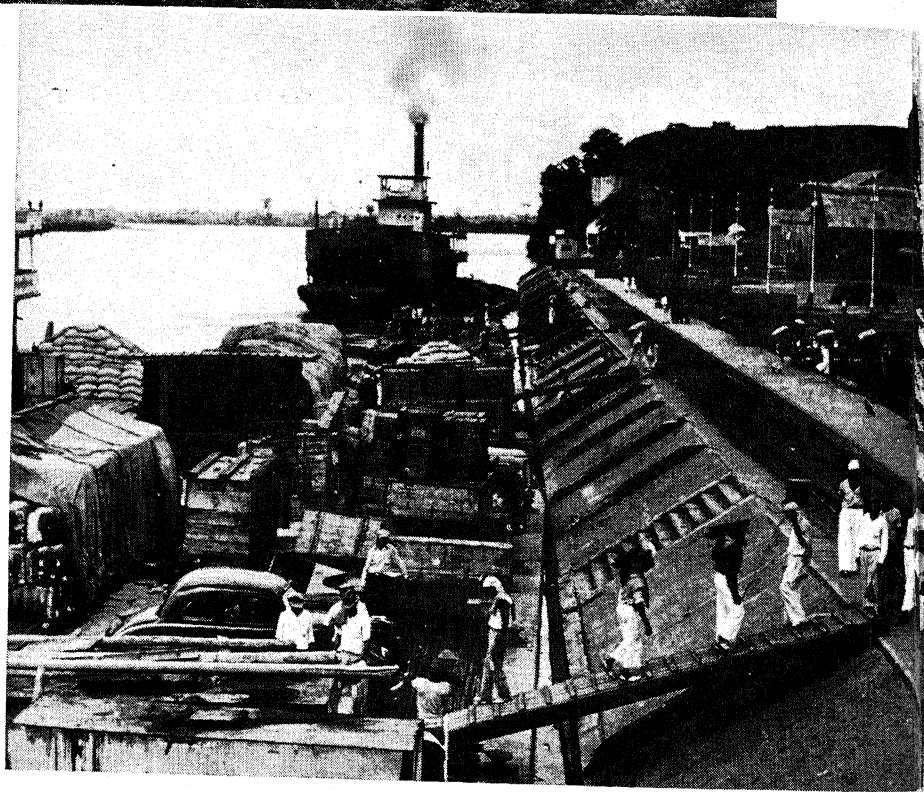
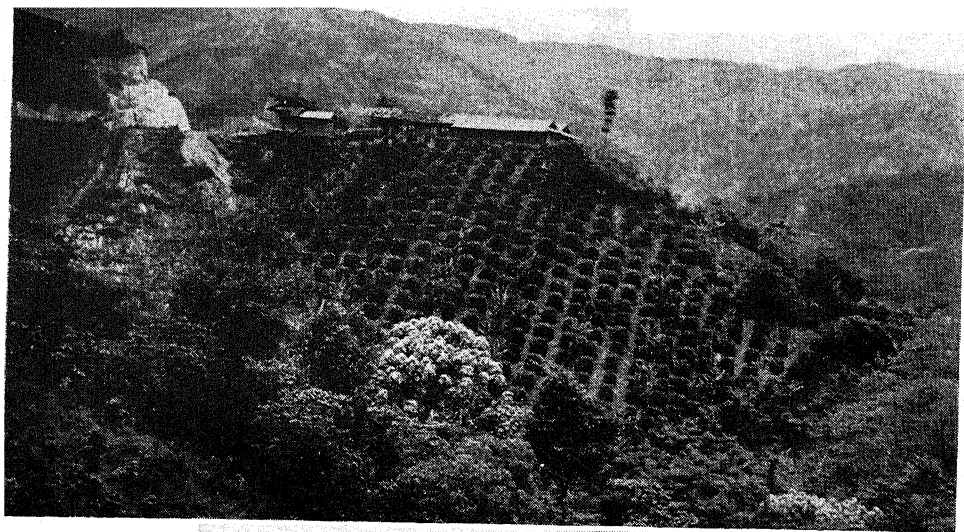
The population of the whole Cauca Region, except for the town of Popayán, remains predominantly Negro and mulatto. This is true not only of the rural districts, where Negro tenants live and work on the large estates owned by absentee landlords; it is true also of the urban populations of both Cali and Buenaventura.

The Cauca Region is beginning in a very minor degree to show signs of expanding settlement. This expansion is not at all comparable with the frontier movement around Antioquia, but it is nevertheless important to record it. Negro families, a few at a time, are moving out of the crowded Cauca Valley over the Cordillera Occidental and into the forests of the Atrato—San Juan valleys and the Pacific Coast. Negroes provide most of the workers in the placer gold and platinum mines of the Atrato area (Map 19); Negroes are concentrating in the vicinity of Buenaventura; but they are also scattering through the thinly populated forests both to the north and to the south of Buenaventura, where they occupy small clearings and practice a shifting cultivation of food crops. In the selvas of western Colombia the black people are proving better able to survive than the native Indians who are being eliminated as a result of this migration (55).

V. THE PASTO REGION

Another and entirely different area of concentrated settlement is found in the southern part of Colombia, partly in the Cordillera Central, partly in the structural depression drained by the Río Patía. This cluster of people forms the center of the Department of Nariño, and is focused around the town of Pasto (Maps 21 and 23, and the outline on p. 94). Here the population is composed almost entirely of Indians and mestizos, the properties are small, and there is little commercial production.

The southern part of Colombia is made up of two ranges of mountains, the Cordillera Central and the Cordillera Occidental. Where the folded Cordillera Oriental comes to an end, about 2° north of the equator, the Cordillera Central becomes the easternmost of the Colombian Andes. Between the Cordillera Central and the Cordillera Occidental lies the southward continuation of the great rift valley, drained, in this region, by the Río Patía. This part of the rift valley resembles the upper part of the Cauca Valley around Popayán, for its ash fill is deeply dissected by the streams, and the initial surface is represented only by isolated terrace

The upper picture shows Bogotá, capital of Colombia, located 8,700 feet above sea level at the eastern margin of the high Basin of Cundinamarca. The mountains east of it rise high into the zone of the *páramos*. (Courtesy of International Telephone and Telegraph Co.) The lower picture is of the port of Cartagena. In the days of the Spanish colonial empire Cartagena was a major stronghold, because of its excellent harbor and the presence of a hill which could be fortified.

The coffee grown on this hillside in Antioquia, Colombia, (*above*) is of very fine flavor and commands a high price in the New York market. Small properties, worked by owners mostly of unmixed European descent, are characteristic of this region. (Courtesy of the American Coffee Company.) Below is a picture of the river front at Barranquilla, near the mouth of the Río Magdalena. The barge

remnants. The elevation of these terraces is considerably higher than that of the terraces around Popayán—8,500 feet at Pasto. The Río Patía escapes from the rift valley through a gorge which crosses the Cordillera Occidental to the Pacific Coast, and which is so narrow and deep that it is quite useless as a line of travel. The whole region is one of abundant moisture, with two rainy and two dry seasons.

The Settlement

There is no commercial focus on Pasto such as has been developed in the Cauca Region on Cali. The Indian subsistence farmers occupy the small valley flats in the cordillera or the small terrace remnants and basins in the rift valley, wherever the slopes are gentle enough to permit the growth of crops. They cultivate chiefly grain and potatoes, and utilize the high páramos for the grazing of cattle. Commercial exchange is still largely by barter at the more or less regular fairs held in the numerous small towns and villages. Exchange with the outside world, however, is small.

At one time Pasto was a more important commercial center than it is today. Rubber and cinchona bark were gathered in the forests of the eastern mountain slopes, in the valleys of the Río Caquetá and the Putumayo. From these very remote districts the easiest routes of export were up the rough mountain trails to Pasto. Transportation was partly on muleback, partly on the backs of Indian porters. From Pasto a trail crossed the Cordillera Occidental and descended by way of Barbacoas to the Pacific port of Tumaco. Since the decline of rubber and cinchona, Pasto has lost this activity, and the trails to the east have been largely obliterated by the growth of luxuriant vegetation. A small trade in food products today descends from Pasto to supply the communities of Negro gold miners in the coastal zone.

VI. THE CARIBBEAN COASTAL LOWLANDS

The sixth group of settlements is on the Caribbean Coastal Lowlands. Three distinct clusters of people occupy this region: one centers on the port of Cartagena, in the Department of Bolívar; another centers on Santa Marta, in the Department of Magdalena; and the third centers on Barranquilla, in the Department of Atlántico (Maps 16 and 20, and the outline on p. 94).

Where the Río Magdalena emerges from its structural valley between the Cordillera Oriental and the Cordillera Central it enters a lowland plain,

built by deposits of river alluvium. This is a land subject to frequent inundations, much of it swampy even at low water; a land marked off in a crescent pattern of meandering rivers and abandoned channels, with little strips of habitable ground on the natural levees bordering the channels. The maze of swamps, oxbow lakes, and rivers is fed by the waters of four streams: the Magdalena, the Cauca, the San Jorge, and the César (Maps 16 and 17). Most of the surface east of the Magdalena is permanently covered with water—there are vast shallow lakes or reed-filled swamps with fluctuating outlines, known as *ciénagas*. West of the Magdalena large areas disappear under water during the season of floods, but dry out during the single dry season from October to March, at which time cattle may be pastured on them. At present the main outlet for all this water is through the mouth of the Magdalena, and this mouth, discharging into the tideless Caribbean, was, until recently, so clogged with sand bars that ocean boats could not enter, nor river boats leave. The whole area is covered with dry scrub forest and wet savanna.

From the beginning of the colonial period to the present day the story of the settlement of the Caribbean Coastal Lowlands is one of continued rivalry among three ports for the commerce moving in and out of the interior of Colombia. The Río Magdalena, difficult and unsatisfactory as it is for navigation, has remained the chief route between the coast and the centers of population in the highlands. At the northern end of the Magdalena route, however, Cartagena, Barranquilla, and Santa Marta have competed for the traffic, and as the fortunes of each of them rose and fell the clusters of people in the districts around them have increased or decreased.

Cartagena

During most of the colonial period Cartagena was able to maintain a lead over the other competing ports. Cartagena was founded in 1533 on the shores of a protected harbor, near a fortress which commanded the entrance to the bay. Just south of Cartagena a natural side channel of the Magdalena, known as El Dique, provided a connection with the main river navigable for the shallow-draught boats and canoes of that period. Cartagena became one of the chief ports of colonial Spanish America, and its fortress was a key unit in the system of defense. During the Wars of Independence, however, neglect permitted El Dique to fill with silt until it was no longer navigable; whether as a cause or as a result of this neglect, Cartagena lost its pre-eminence and declined in population.

During the present century Cartagena has regained some of its importance. The construction of a railroad to Calamar on the Magdalena (Map 19) serves to divert some of the river trade. An important part of Cartagena's trade, however, comes to it by launch, canoe, and airplane from the Atrato Valley. This thinly populated region, known as the Territory of the Chocó, is reported to be one of the most promising parts of South America in potential gold production (25). In the stream gravels at the headwaters of the San Juan and the Atrato rivers, platinum has been mined for more than three decades, and for many years Colombia has been among the two or three leading producers of this metal in the world. Placer mining for gold or platinum requires few people either for the work of extracting the metal or for transportation to a point of shipment; and the more advanced the mining technique, the fewer the laborers that must be employed. Cartagena, as the port where gold and platinum are concentrated, enjoys a greater activity than the population of the part of its hinterland in the Atrato Valley would seem to warrant.

Today, Cartagena is a city of about 90,000 people. Along the railroad line to Calamar there is a district of dense rural settlement, where sugar and cotton are raised on both large and small plantations. There is one modern sugar mill in this district. The country between Cartagena and Barranquilla is also utilized, beyond the zone of plantations, for the grazing of cattle. The rural population is predominantly Negro.

Santa Marta

On the eastern side of the Caribbean Coastal Lowlands is the Santa Marta district, centering on the old colonial port of Santa Marta. This place, like Cartagena, enjoys the advantage of a good harbor; and through the ciénagas on the eastern side of the Río Magdalena, shallow-draught boats and canoes could reach Santa Marta with fully as much ease as they could reach Cartagena through El Dique. When Cartagena's connection with the main river was no longer navigable Santa Marta took its place for a time as the chief commercial center of the region. Both of these rivals, however, were placed at a disadvantage when steamboats began to operate on the Magdalena, for neither Santa Marta nor Cartagena could be reached by these much larger vessels.

Santa Marta has now turned to an entirely different kind of activity. In the district along the western piedmont of the Sierra Nevada de Santa Marta, south of the port, the United Fruit Company has established one of its banana plantations (Map 19). The banana-growing area has now

been expanded by the addition of many small plantations, the owners of which sell their product to the company. A railroad line carries the fruit to specially designed docks at Santa Marta, where boats, built for this particular trade, carry it to North America. The laboring population and the independent planters are mostly Negroes; the small group of managers and overseers are mostly North Americans.

Barranquilla

The third commercial center of the Caribbean Coastal Lowland, and the one which today controls the trade of the Magdalena Valley, is Barranquilla. This town was brought quickly to a leading position about the middle of the nineteenth century when steamboats began to navigate the river as far as the Honda rapids. For a long time Barranquilla was only a river port, since the sand bars at the mouth of the river prohibited the entrance of ocean steamers. In 1862 a short railroad line was built from Barranquilla to a place just west of the river mouth, where a pier was constructed far enough into the shallow waters of the Caribbean to be reached by ocean boats. Later this first port was abandoned because of rapid silting, and Puerto Colombia, the present port, was built. This place is now connected with Barranquilla by both railroad and automobile highway. In recent years a North American company completed dredging operations which make possible the entrance to Barranquilla of ocean steamers of 10,000 tons. This outstanding city has now reached a population of over 150,000.

The cluster of people in the Department of Atlántico also includes some agricultural settlers. West of the Magdalena there is a small but densely populated area devoted to the production of cotton and sugar—an area of small properties and of predominantly Negro population. Negro farmers, also, are strung along the natural levees on either side of the Magdalena, raising vegetables and fruit which they bring to the Barranquilla market in canoes.

THE MAGDALENA AS A ROUTE OF TRANSPORTATION

Bogotá, the capital city of Colombia, does not occupy a site where the lines of transportation naturally converge. Since the beginning of Spanish settlement one of the major problems faced by the people of Bogotá has been that of establishing satisfactory lines of communication with the sea. Within the central area of the Cordillera Oriental, the problem is not difficult, for this region is one of broad valleys and basins

of gentle slope; today railroads and automobile roads radiate from the capital and provide easy access to the other settlements of this area. The extension of these roads and railroads to more distant places, however, has been accomplished only in the face of serious natural obstacles. Nevertheless, road and railroad connections from Bogotá have been built beyond the central area in three directions: one road has been built northward to connect, through Cúcuta, with the Venezuelan highway from Caracas; another crosses the ridge east of Bogotá, passes some formerly isolated Indian communities on the eastern slopes, and descends to the edge of the eastern plains at Villavicencio (Map 16); and four roads, two of them passable for automobiles, descend from the Basin of Cundinamarca westward to the Magdalena. There is regular service by trucks and passenger busses on all these highways.

The Routes to Bogotá

The main line of access to the heart of Colombia follows the Magdalena River from the Caribbean ports. Each of the areas of concentrated settlement in the Cordillera Oriental and in the Cordillera Central has sought to establish its connections with the river. Since early colonial times the Magdalena has been Colombia's chief artery of commerce and communication.

Actually, however, the Magdalena route is anything but satisfactory. Obstacles to navigation on the Magdalena begin at its mouth where sand bars long prevented the entrance of the deep-draught ocean vessels. Even shallow-draught river boats have difficulty with the river, for above Calamar the channel frequently shifts because of changes in the position of sand bars. The river is subject to sudden, short floods produced by local storms on its mountain tributaries. The annual fluctuation of the water-level is also large, with the lowest water coming in November. Slowly and painfully the stern-wheel river steamers feel their way upstream—until further navigation, even at high water, is stopped by the rapids at Honda, 615 miles up the river from the Caribbean (Map 16). Upstream from Honda the river is again navigable for shallow-draught boats as far as Neiva.

In spite of these difficulties, the several highland centers have all established their outlets through river ports. Ocaña is served by Puerto Nacional, and Bucaramanga by Puerto Wilches. The thriving communities of Antioquia around Medellín are connected with Puerto Berrío. Manizales is connected by a cable line over the Cordillera Central to a

station on the railroad near Honda. The settlements of Boyacá and Cundinamarca are reached by several roads which descend to the river banks between Honda and Girardot. The construction of a railroad between Girardot and the capital was begun in 1880 and completed in 1909. But the high cost of building and operating this line necessitated such high freight rates that a large proportion of the goods shipped between Bogotá and the Magdalena continued to move by muleback or oxcart. In recent years motor trucks have been more effective than the railroad in competing with these more primitive forms of transportation.

Honda was at one time a commercial center of major importance. Because of its location at the head of navigation on the lower river Honda was the point where goods destined for the coast were gathered from all the surrounding country—not only from Cundinamarca, but also from the Cauca Valley on the western side of the Cordillera Central. A road from Honda was built over the high Quindío Pass, just south of Mt. Tolima (Map 17). This road passed through Cali, and thence continued southward by way of Popayán and Pasto to Quito in Ecuador. Honda became a major focus of colonial routes, and for a time was one of the leading commercial centers of South America. But the importance of Honda was undermined by the construction, in 1884, of a railroad which tapped the traffic of the lower river about twenty-five miles below the town and provided transportation around the rapids. This railroad now reaches Girardot and Neiva (Map 19).

Meanwhile a route directly westward from Bogotá to the Pacific has been developed. Although the distance from the capital to the port of Buenaventura is much less than to the Caribbean port of Barranquilla, the route to the Pacific requires a climb over the Quindío Pass (11,099 feet), a descent into the Cauca Valley to Cali, and another climb over the Cordillera Occidental. At present the only gap in the complete rail connections between Bogotá and Buenaventura is over the Quindío; and this gap has been covered since 1939 by an automobile road over which trucks and passenger busses provide regular service.

The trip upstream from the Caribbean ports to Bogotá used to take from eight days to a month. Now, passengers and mail are flown from Barranquilla to Bogotá, a distance of about 450 miles, in two and a half hours. Colombia, in fact, had the first commercial air line to be placed in regular operation in the Western Hemisphere—a German line which was started in 1920, flying along the Magdalena between Barranquilla and Girardot. The air lines are now nationally owned and operated; regular flights reach all of the chief centers of the country in a few hours

from Bogotá; places which once required months of hard travel to visit are now easily accessible from the capital. But air lines do not solve the problem of transporting such things as wheat, coffee, or manufactured articles.

Settlement in the Magdalena Valley

The Magdalena Valley remains sparsely occupied and shares little of the vigorous economic life which is concentrated on either side of it. As the Negro slaves were given their freedom they drifted away from the big estates on the highlands and sought refuge in the forests of the valley. Today, there are scattered clearings in the valley devoted to the haphazard production of subsistence crops, and to small quantities of such commercial crops as sugar cane, cacao, tobacco, and cotton. For many decades Negro woodcutters found employment along the river in providing fuel for the river boats, but now that most of these boats burn oil, this work is no longer needed. Only in the immediate vicinity of the river towns is the population density as high as ten per square mile.

Recently a new form of economic life has appeared in one part of the Magdalena Valley. This is the development of an oil field along the eastern side of the river in the Department of Santander. A large field, controlled by a North American oil company, has been brought into production near the river port of Barrancabermeja (Map 19), and, since 1926, a pipe line has carried the oil from this field to Cartagena on the Caribbean. In this oil field the story of Maracaibo is being re-enacted on a smaller scale.

COLOMBIA AS A POLITICAL UNIT

No other political unit in South America contains so many diverse elements within a comparable area as does Colombia. The total national territory includes a vast extent of land east of the Cordillera Oriental in which settlement by Colombians is either very scanty or entirely lacking. To be sure, some of the Colombian Llanos of the Orinoco are utilized for cattle, but most of this part of Colombia is outside the effective national territory. Within the inhabited parts of the country there is an extraordinary diversity of physical conditions—a diversity which comes in part from the rugged surface, and in part from the existence at these latitudes of the maximum variety of vertical zones. The effect of these altitude differences on the Colombians is permitted full expression because of the existence of relatively gentle slopes at different elevations

all the way from sea level to the snow line, and because of the importation into the region of cattle, European grains, sugar cane, and coffee which made possible the gradual extension of productive land use in all these different zones.

The diversity of the Colombian scene, however, is more than a matter of the physical setting. As we have seen, there are fourteen different clusters of people. Among these various clusters we have observed differences in racial composition from pure European to pure Indian and to pure Negro; we have observed contrasts in the economic life ranging from close connection with international markets to subsistence agriculture. A student of government would point to the contrasting roles each of these groups has played in the internal politics of the country, ranging from the conservative politics of the people in Antioquia to the liberal politics of the Cundinamarcans. It would be difficult to conceive a pattern which, on first glance, would seem to offer less hope for the establishment of national unity and coherence. Yet Colombia has achieved these things, and the accomplishment represents an astounding victory of man over nature, and of man over man.

But perhaps there are certain factors in the complex geography of this country which have aided the establishment of national coherence. It is a matter of fundamental importance that at the time of the Spanish conquest the native Indian inhabitants were not united in one strong political organization, deeply intrenched on the land, as were the Indians of Ecuador, Peru, and Bolivia. The struggle between European and Indian was easier for the Europeans where the Indians were more diverse. To be sure, Bolívar's "United States" fell to pieces quickly as a result of the many factions that could be made to co-operate only by the strong hand of authority, and during most of the nineteenth century Colombia was torn by internal conflicts. Perhaps, however, the achievement of national unity was fostered by this same diversity, in which no element was large enough to overcome all the others.

Internal Currents of Commerce

Internal commerce between the various parts of Colombia has been carried on persistently, just as it was even before the arrival of the Europeans. The highland Chibchas used to exchange their salt for the gold prepared by the Indians of the Cauca Valley. The Spaniards increased and diversified this trade between highlands and lowlands, exchanging wheat and potatoes for sugar cane and cotton. Even during the period

of chaos which followed the death of Bolívar the undercurrent of commerce continued to link the various parts of the country together.

Today the Magdalena Valley carries not only imported goods and products of the country destined for export; it carries also articles of domestic commerce. Up the river go the cattle, sugar, and cotton of the Caribbean Coastal Lowlands consigned to the highland centers. The lowland cotton now supplies the greater part of the raw material for the textile factories of Medellín. Grain and potatoes from the high basins of Cundinamarca and Boyacá descend to help in feeding the lowland populations. Two of the chief commercial crops in Colombia in terms of acreage are sugar cane and cacao; yet sugar and cacao enter scarcely at all into foreign commerce, for most of these products are consumed in the candy factories of Medellín and Bogotá. There are close commercial connections between the Cauca Valley and Antioquia. Even remote Pasto sends a trickle of commerce to the gold-mining communities of the coastal region. All of these currents of internal trade have been of great importance in overcoming the isolation of the fourteen areas of settlement.

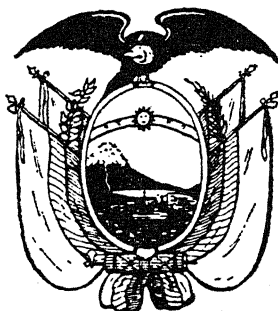
Foreign Commerce

Coffee is the crop which has contributed most to the material prosperity of the Colombians, especially to the Antioqueños. Colombian coffee enjoys a favored position on the world markets because it is mixed with the stronger Brazilian coffees to give a distinctive flavor to each of the various blends. In 1939 Colombian coffee was quoted in New York at 12.5 cents a pound as compared with 5.2 cents for Brazilian coffee. Since 1920 Colombia has been the world's leading source of mild, high-grade varieties of coffee, and second only to Brazil in total production. Even as early as 1910 coffee was making up 53 per cent of the value of Colombian exports. In 1925 it amounted to 78 per cent. Now, with the petroleum industry providing Colombia's second most valuable product, coffee is reduced to 55 per cent (1938); but in this year Colombia produced 21 per cent of the coffee exported from Latin America. If petroleum is excluded from the list, coffee is found to make up about two thirds of the value of all exports. Of the coffee trade, 78 per cent in 1938 was with the United States, which holds a predominant position in the foreign commerce of Colombia, both in exports and imports. The other two principal products of the country, gold and bananas, which stood third and fourth respectively in 1938, also go chiefly to the United States.

The direct benefits to Colombia from the export trade are derived largely from coffee, since the other chief products are mostly in the hands of foreign companies. These other products require the services of a relatively small proportion of the workers. The oil fields are said to employ between 5,000 and 10,000 people; gold and platinum together are produced by about 25,000; the banana industry provides support for a somewhat larger group, but a group which is restricted to one isolated district. The extent to which the rest of Colombia benefits indirectly from the presence of these foreign-controlled enterprises is a question which is argued with much vigor and considerable heat. From the point of view of many Colombians the indirect benefits are greatly exaggerated; but foreign businessmen insist that the investment of capital which their activities represent has quickened the economic life of the whole country.

The commercial production of coffee has had a great effect in raising the material standard of living among the Colombians, especially in Antioquia. So much attention has been paid to coffee, in many cases by farmers who formerly raised food crops for local use, that the production of such basic commodities as rice, wheat, sugar, and vegetables has not kept pace with the increase of population. As a result foodstuffs have appeared on the list of imports to Colombia. A decline in coffee prices might seriously disturb the balance, for no system has yet been devised to assure social progress, economic prosperity, and political stability. But for the time, at least, Colombia seems to have turned diversity of land and people into a source of strength rather than of disintegrating weakness.

4

REPÚBLICA DEL ECUADOR

Total area, uncertain because of boundary dispute with Peru; variously estimated from 116,000 square miles to 337,000 square miles.

Total population, 2,921,688

Capital city, Quito; population, 150,000

Trade per capita:

Imports: $4.33
Exports: $4.76

Unit of currency, sucre ($.338, gold content value)

Major commercial products in order of value:

cacao
petroleum
cyanide precipitates
coffee
gold
rice
bananas
tagua nuts
panama hats
rubber
hides and skins

Railroad mileage, 782

(The above statistics are for the year 1938.)

4

ECUADOR

ECUADOR has not been so successful as Colombia in the establishment of order and coherence in its national life. The problem is more difficult in Ecuador because of the geographical separation within the country of two strongly contrasted groups of people. One group is largely Indian, self-sufficient, unmoved by sentiments of nationality, and quite uninterested in foreign commerce; the other is largely mestizo, strongly conscious of nationality and commercially active. The first group occupies the high intermont basins of the Andes; the second group occupies the coastal region on the borders of the Pacific. Between these two groups the establishment of harmony and co-ordination in the national political or economic life is extremely difficult. And because no great source of revenue for the public treasury, comparable to the oil of Venezuela, has ever been discovered in Ecuador, the country remains poor, and the central political authority remains relatively weak.

Compared with Colombia, Ecuador is much simpler in its geographic arrangement. The backbone of the country is formed by the high ranges of the Andes. There are two high cordilleras, surmounted by towering volcanoes and separated by a series of ten intermont basins all of them lying within the tierra fría. To the west of the Andes is the coastal region, composed partly of swampy lowlands, partly of low hills. The coastal region is covered in the north by a dense rain forest, but toward the south as the rainfall becomes less, the vegetation changes from wet forest to dry scrub forest and savanna. The third part of Ecuador lies

east of the Andes. This is the *Oriente*, the rainy forested eastern slopes of the mountains and the Amazon plains beyond.

The national territory of Ecuador is of uncertain area. Most of the Ecuadoreans live in the high basins of the Andes and on the coastal lowland, leaving the Oriente mostly outside of the effective national territory. The Oriente, moreover, is claimed not only by Ecuador but also by Peru, and the Peruvians have already established their northern and eastern boundaries with the Colombians and the Brazilians (Map 32). If the maximum of the Peruvian claims in the Oriente were granted, Ecuador would include only about 116,000 square miles; but if the Ecuadoreans could make good their claim to the Oriente, they would possess a total of 337,000 square miles of territory.

POPULATION AND SETTLEMENT

No one knows how many people there are in the effectively occupied parts of Ecuador. Estimates vary from less than two million to nearly three million. The rate of increase seems to be slow. The proportion of people of pure Spanish ancestry is said to be between 1 and 8 per cent. More than 50 per cent of the population is pure-blooded Indian, and another 25 per cent is made up of mestizos among whom the Indian blood is predominant. About 15 per cent of the population is Negro. The pure Indian element makes up nearly 100 per cent of the population of the highlands; the coastal region is occupied mostly by mestizos and Negroes, with a few communities of pure Indians. Whether or not these estimates are somewhere near the true proportions there can be no doubt that Ecuador is an Indian country with only a small mixture of "Latin."

Course of Settlement

The high basins of Ecuador were already occupied by a dense population of sedentary Indians before the Spanish conquest. Shortly before the Europeans arrived on the scene, the Incas had extended the boundaries of their Empire northward to include Quito. But the distance which separated this northernmost region from the capital at Cuzco was so great that communications were difficult to maintain and the power of the central authority was established only because the Inca himself spent much of his time in Quito. The Inca Empire was threatened with division and internal discord at the time when the Spaniards reached the shores of Peru.

ECUADOR AND SOUTHERN COLOMBIA
LAND USE
LIVESTOCK RANCHING WITHOUT AGRICULTURE
SHIFTING CULTIVATION
SEDENTARY SUBSISTENCE AGRICULTURE
SEDENTARY SUBSISTENCE AGRICULTURE.-IRRIGATED
CACAO
COFFEE
SUGAR
COTTON-IRRIGATED
PERMANENT SNOW AND HIGHER PÁRAMOS
PETROLEUM
GOLD
4°
80°
0°
COLOMBIA
ECUADOR
OCEAN
PACIFIC
ZORRITOS
LOBITOS
NEGRITOS
ECUADOR
PERU
SCALE
0
100
MILES

MAP 22

Except for temporary landings along the coast made by Pizarro and his men as they worked their way southward, Ecuador was not entered by the Spaniards until after the conquest of Peru. In 1534 an expedition advanced northward from Peru and occupied the Indian town of Quito. From Quito the Spaniards continued northward into the Cauca Valley of Colombia, founding the towns of Pasto and Popayán (Maps 5 and 21).

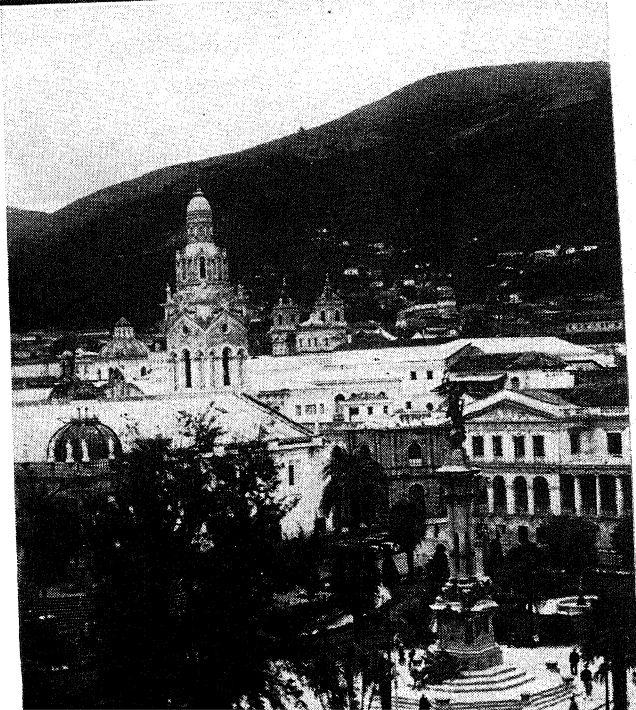
The search for El Dorado, however, did not bring to light any great wealth in this part of South America. Restlessly the Spaniards pushed their explorations down the western slopes to the Pacific, and eastward to the headwaters of the Amazon. In 1542 the Spaniard, Orellana, sailed the length of the Amazon to its mouth, but without discovering what the Spaniards most desired—gold and large concentrations of Indians. Ecuador remained isolated and poor.

Isolation and poverty, rather than any strong sentiment of nationality, gave Ecuador its political independence. During the colonial period Quito had been administered first from Lima and later from Bogotá. When the Wars of Independence freed the colonies from Spain, Quito was included with Colombia and Venezuela in a "Greater Colombia" which Bolívar attempted to form and administer from Bogotá. The collapse of Bolívar's state left the more remote parts, Venezuela and Ecuador, to announce their independence.

Formation of the Northern Boundary

These historical events have left certain curious features in the present-day political geography of this part of South America. One of these features is the position of the northern boundary of Ecuador with reference to the areas of concentrated settlement (Map 23). This is one of the three places in Latin America where an international boundary cuts through the center of a cluster of people. The manner in which the boundary between Ecuador and Colombia was established through the Basin of Tulcán offers an illustration of one of the main themes of this study of Latin America—namely, the existence within the same territories of peoples of strongly contrasted ways of living, of diverse groups which have mixed but never blended.

The development of national sentiment which made the drawing of a boundary necessary took place among the Spaniards and the mestizos who had adopted Spanish attitudes and objectives. The desire for independence was strongest in the political centers—in Bogotá and Quito; and the position of the dividing line which separated the territory adher-

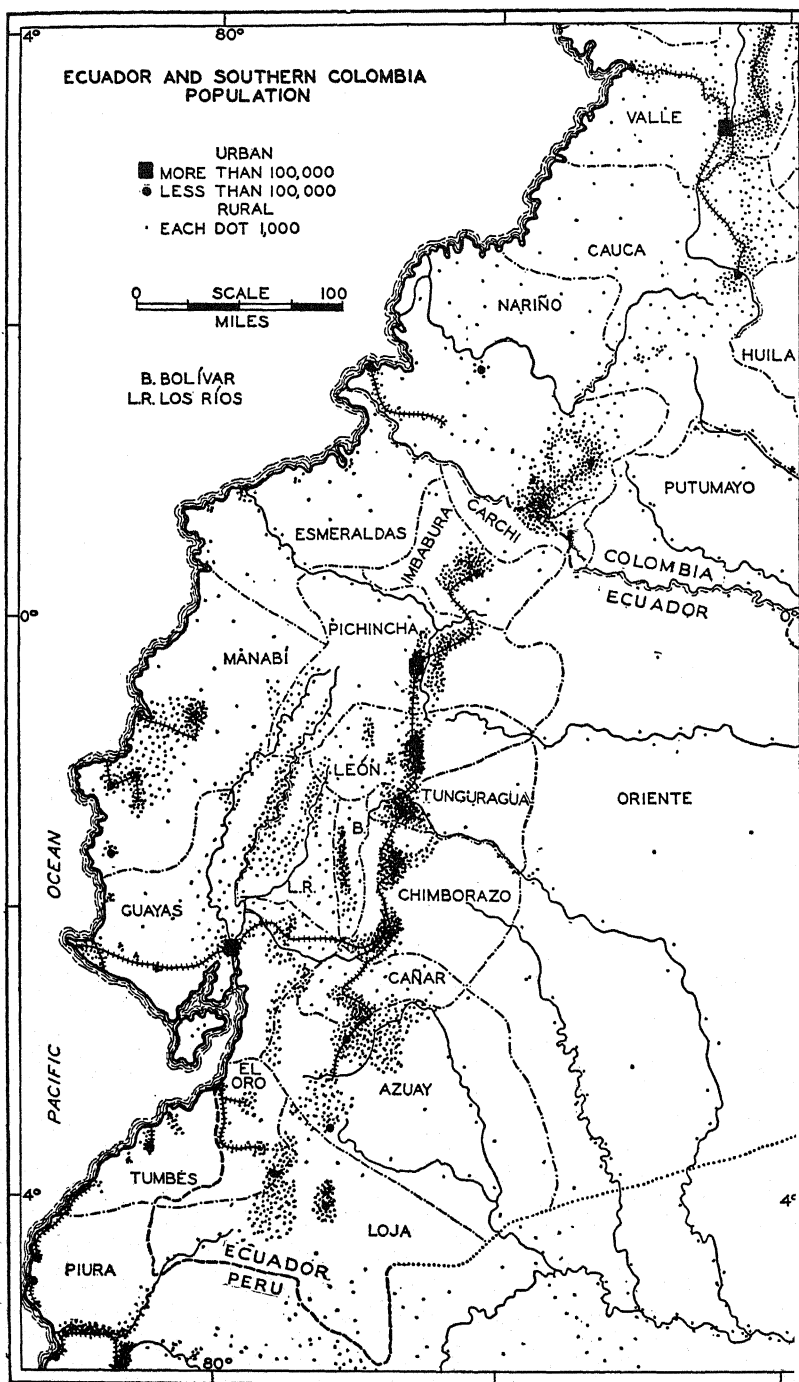
Although Quito is almost on the Equator, the air here is always chilly, for this city of over 150,000 people is over 9,000 feet above sea level and is circled by high mountains. The average monthly temperature of Quito is 54° F., with a range of less than one degree. The volcano Pichincha shown in the upper picture is no longer active, and on its lower gentler slopes are small farms devoted chiefly to grains and potatoes. The center of Quito is shown in the lower picture. This is the Plaza Independencia, a plaza of gardens, fountains, and tropical trees. On one side of the plaza is seen the ancient cathedral of Quito. (Both photos, courtesy of the Grace Line.)

ing to one of these centers from the territory adhering to the other was determined more by conditions in the capitals than by local arrangements along the border. The people actually separated by the boundary are mostly pure-blooded Indians, to whom the distinctions of nationality even to this day seem unimportant.

The actual position of the line was the result of historical events at the time of the separation of Colombia and Ecuador. The territory around Pasto in Colombia, which had originally been settled from Quito, might well have become a part of Ecuador had not a revolt in the Ecuadorean capital given the armies of Bogotá the advantage at a critical moment, which they accepted by pushing southward into territory formerly administered from the rival center. Since the Spaniards lacked detailed information regarding the arrangement of intermont basins and of the Indian communities, the clear separation of the Basin of Tulcán from the Basin of Ibarra by the Páramo de Boliche (Map 21) was ignored. The boundary was established on an obvious natural feature—the Río Tulcán, which cuts through the middle of the intermont basin.

The Regions of Settlement. Unfortunately for the establishment of order among such diverse elements as exist together in Ecuador, the political center of the country is located in the midst of the Indian communities of the Andes whereas the economic center of the country is located on the coast. Quito, the capital, a city of perhaps 150,000 inhabitants, is situated where the problems of foreign commercial and political relations seem remote indeed. Guayaquil, the chief commercial city, with a population of about 180,000, is located on a navigable river easily accessible to the sea. This geographical separation of the political and the commercial centers, and the fact that the contacts between the highland Indian communities and the lowland settlements are not intimate is a major factor in the interpretation of Ecuador's internal difficulties. Let us consider each of the regions in turn.

THE HIGHLAND REGION

From the northern border of Ecuador for about two hundred and fifty miles southward to the Basin of Cuenca (Map 21), the Andes are similar in geologic structure to the Cordillera Occidental and the Cordillera Central of Colombia. Together these two cordilleras form an arch of crystalline rocks, with a section along the axis which has collapsed to form a continuous north-south rift. But in Ecuador the volcanic activity which borders this rift is much greater than it is in Colombia. Standing

ECUADOR AND SOUTHERN COLOMBIA
POPULATION
URBAN
MORE THAN 100,000
LESS THAN 100,000
RURAL
EACH DOT 1,000
0 SCALE 100
MILES
B. BOLÍVAR
L.R. LOS RÍOS
80°
4°
0°
VALLE
CAUCA
NARIÑO
HUILA
PUTUMAYO
CARCHI
IMBABURA
ESMERALDAS
COLOMBIA
ECUADOR
PICHINCHA
MANABÍ
LEÓN
TUNGURAGUA
ORIENTE
B.
L.R.
CHIMBORAZO
GUAYAS
CAÑAR
OCEAN
PACIFIC
EL ORO
AZUAY
TUMBES
LOJA
PIURA
ECUADOR
PERU

Map 23

which we have already noted in Colombia as extending southward from Cartago. Each basin is occupied by a dense population which is almost pure Indian, and which makes use of the land for the cultivation of subsistence crops or for the grazing of cattle.

The three northernmost basins in Ecuador are drained by streams which descend westward to the Pacific (Map 21). The Basin of Tulcán, which is cut in the middle by the boundary between Ecuador and Colombia, lies at an elevation of 9,500 feet and is, therefore, too high for any crops except the potato. The Páramo de Boliche, just south of the Basin of Tulcán, is used as common pasture by the near-by Indian communities, but contains few fixed settlements. Just south of this páramo lies the Basin of Ibarra, formed as a sort of amphitheater of high terrace remnants around the head of the deeply incised valley of the river which drains it. On the remnants of the basin floor, some seven to eight thousand feet above sea level, there are numerous small Indian villages, and around them the farmers raise grains and potatoes. Far down in the bottom of the valley, only 2,500 feet above sea level, there are small plantations of sugar cane and cotton, owned by the people of Ibarra.

The Basin of Quito is next to the south. The northern part of this basin is deeply dissected, like the Basin of Ibarra, by the stream which drains westward through the cordillera. The southern part of the Basin of Quito, however, is composed of gently rolling hills which are utilized for crops and pasture. The rural population in the areas where people are clustered is between twenty-five and sixty per square mile. The city of Quito, capital of Ecuador, was established on the site of an old Indian village on the slopes of the volcano Pichincha, at an elevation of 9,350 feet above sea level.

South of the Basin of Quito the high páramos form a narrow connection between the eastern and western cordilleras. South of this, again, lies the Basin of Latacunga, in which are found the small towns of Latacunga and Ambato. This is a dry and relatively poor area, deeply dissected by the headwaters of the east-flowing Río Napo. The Basin of Latacunga and the Basin of Riobamba, next to the south, are all but completely separated by the massive pedestal of Mt. Chimborazo. The area around Riobamba, like the area around Ambato and Latacunga, is made up of such porous material that only small parts of the district are capable of raising crops. Over this difficult terrain, avoiding the deeply dissected valleys, and winding around the lower slopes of Chimborazo, passes the railroad, which has been built at great cost to connect Quito with Guayaquil (Map 22).

South of the Basin of Riobamba is the Basin of Alausí. This is not a structural basin, like the others, but a widening along the valley of a river which drains westward to the coastal region. The railroad to Quito takes advantage of this valley flat in its difficult ascent from the lowlands. The Basin of Alausí, lying below eight thousand feet and having an alluvial soil, is intensively utilized for subsistence crops.

The southernmost of the structural basins of Ecuador is the large one in which the town of Cuenca is located. Cuenca, with a population of 45,000, is the only town in the highlands besides Quito which could be said to have a dominantly urban function. The Basin of Cuenca and the Basin of Quito are the two most productive areas of the highland region. Around Cuenca gentle slopes at an elevation between eight and nine thousand feet above sea level, a soil which is less porous than that of most of the highland basins, and a plentiful rainfall combine to provide good conditions for the growth of grains. A larger proportion of the floor of the basin is devoted to the production of food for the human inhabitants, instead of feed for the animals, than is the case in any of the other high basins. Cuenca is also one of the centers for the weaving of Panama hats, the straw being brought to the highlands from the coastal region.

Three other intermont basins, developed along stream valleys, lie to the south of Cuenca. These are Oña, Loja, and Zaruma. The people concentrated in these districts cultivate subsistence crops and raise cattle. Loja and Zaruma are the only highland settlements which do not send their few products to Guayaquil exclusively; they supply small numbers of cattle to the oases of the Peruvian coast to the southwest of them (Map 22).

Throughout the highland region of Ecuador the forms of Spanish and Indian life are strangely mixed. Only in Quito and Cuenca are there any important numbers of people with Spanish ancestors, and these are either officeholders in the government or landowners who have large private properties in the vicinity. On the private estates there are many villages of Indian tenants who pay rent to the owners. But the land is not all divided into private holdings: there are numerous Indian landowning communities, practicing their traditional communal form of tenure. The economic life is for the most part the production of foods for local subsistence, but from both the private estates and the Indian communities cattle are sold regularly, though in small numbers, outside the region. The animals descend on the hoof over the mountain trails and must be fattened on the lowland pastures before they are marketed.

THE COASTAL REGION

The people of the coastal region, unlike those of the highlands, are engaged part of the time in the production of commodities for export. Moreover, there are few pure-blooded highland Indians who have descended to the lowlands. Most of the inhabitants of the coastal region are mestizo, with a considerable mixture of Negro. Where pure Indian communities exist in the lowlands, they are composed of Indians who are very different in appearance and in way of living from those of the highlands.

The Land

One of the narrowest zones of transition in all South America is the coastal region of Ecuador. Within a few degrees of latitude one passes from tropical rain forests in the north of Ecuador to desert at the southern border. Except for the coastal hilly belt which reaches a maximum elevation of about 2,500 feet in the high "sierras" west of Guayaquil, most of this region is a lowland, less than 1,000 feet in altitude. In the north it shares the double rainy season of Colombia, with enough rain throughout the year to support a selva (Map 7). Not far south of the border of Colombia, however, the double rainy season gives way to a single rainy season, from December to June. As one goes farther south the rains begin later and end sooner. At Guayaquil they come between January and May. The Santa Elena Peninsula, and the southern end of the hilly belt west of Guayaquil are deficient in moisture; here one comes to the beginning of that great dry belt which stretches southward, first on the western side of the Andes and then on the eastern side, almost to the Strait of Magellan. The southern part of coastal Ecuador is dry, and settlement is limited to the places where water can be had for irrigation.

The natural vegetation corresponds to this transition. As the length of the dry season increases toward the south, the selva gives way to a semideciduous forest in which some of the trees drop their leaves during the period between the rains. Still farther to the south this forest is succeeded by a deciduous scrub forest composed of low thorny trees, mixed with patches of savanna. The floodplain of the Río Guayas and its many tributaries is mostly covered with wet savanna and galeria forest. The desert areas have only scattered xerophytic shrubs.

The Settlements of the Northern Coast

The population of coastal Ecuador also differs in character from north to south. In the north there are Negroes in considerable numbers, and

they are increasing at the expense of the native Indians, as they are in the coastal region of Colombia. Around Esmeraldas there is a small cluster of Indian and Negro farmers, and smaller groups are scattered more thinly over the interior. Shifting cultivation is practiced, with temporary clearings devoted to crops around permanent villages. Negroes are engaged, also, in a more or less haphazard search for gold in the stream gravels, and in some years gold becomes an important export of Ecuador.

As the land becomes drier and the forests thinner the Indians are better able to survive than the Negroes. The first dense Indian settlement is found a little south of the equator, where a population of from 25 to 60 people per square mile is centered around several little towns, the largest of which is Chone with a population of 10,000. Sedentary subsistence agriculture rather than shifting agriculture characterizes the Indian settlements. In addition there are a few plantations of cacao; and from the woods come tagua nuts—used for the manufacture of imitation ivory—which are among the few items of Ecuadorean export. The district around Chone is important also because it is the chief center of the Panama hat industry. The villages of Monticristi and Jipijapa are famous as places where high-grade straw hats may be purchased. The straw comes from a plant which is a native of the scrub forests of this area; the weaving is a domestic industry, carried on chiefly during the dry season.

The only mineral exports of Ecuador also originate in this coastal region. The gold (including cyanide precipitates) from the placer mines inland from Esmeraldas enters into the exports in varying amounts. Of more steady importance is the oil field located near the end of the Santa Elena Peninsula (Map 22). This field is of considerable importance to Ecuador, but it produces only a fraction of 1 per cent of the total exported oil of Latin America.

The Guayas Lowland

The part of the coastal region of greatest commercial importance to Ecuador is the lowland north and east of Guayaquil, and its extension along the eastern shore of the Gulf of Guayaquil. This belt of lowland country, forty or fifty miles wide, lies south of the equator, between the coastal hilly belt and the base of the Andes. Its climate is characterized by high average temperatures, by high humidity and abundant rains during the rainy season, and by an absence of strong winds.

The Guayas Lowland is divided into two different parts on the basis

of the conditions of soil, slope, and drainage. One part consists of river floodplain, subject to inundation during the rainy season; the other part consists of well-drained alluvial fans along the base of the mountains. The floodplain country occupies a kind of pocket, lying just north of Guayaquil. Four rivers wind across it, building the typical crescentic patterns of meandering channels, oxbow lakes, back marshes, and natural levees. But a belt of higher ground separates this floodplain area from the head of the Gulf of Guayaquil—higher ground which is formed, on the west, by a spur of the coastal hilly belt and on the east by a large alluvial fan built by one of the streams descending from the Andes. Only through the Río Guayas, at the site of Guayaquil, can all this water escape to the sea. The alluvial fans along the base of the Andes are composed of material brought down by streams which are at work dissecting the unconsolidated ash of the high basins. The alluvium deposited where these streams emerge from the mountains onto the lowlands is exceptionally porous and of high potential fertility for tropical tree crops. Because of the gentle slope of the fans, as well as the nature of the alluvium, this part of the Guayas Lowland is well drained even where the rainfall is heavy.

Although the Guayas Lowland is the most productive part of Ecuador in terms of exports, its population is not nearly so dense as that of the highland basins (Map 23). There are a few spots of more than twenty-five persons per square mile, but most of the region has between ten and twenty-five. For an Occidental people interested in the cultivation of tropical commercial crops, the most productive parts of the region are to be found on the alluvial fans, or on the natural levees of the floodplain zone. It is interesting to speculate regarding the differences in the density and pattern of settlement which might have resulted if the inhabitants had been rice-growing Orientals—for the inundated area with its abundant water could be made into a land of high productivity of paddy rice. To the people of Ecuador, however, the wet lands are less attractive than the well-drained fans.

Agriculture on the Guayas Lowland

The leading products which come from the Guayas Lowland are cacao, coffee, and cattle. The greater part of the area, actually, is devoted to grazing. The cattle feed on the savannas of the lower fan slopes during the rainy season, and on the wet savannas of the floodplains during the dry part of the year. The smaller area devoted to cacao, however, is

much more productive in terms of exports. Some plantations are found in the lower districts, strung along the natural levees, but most of the plantations occupy the mid slopes of the alluvial fans along the mountain front (Map 22). Ideal natural conditions for cacao are to be found here, for there are continuously high temperatures, abundant rains, a freedom from drying winds, and porous well-drained soils. In addition to the cacao, small quantities of high grade coffee come from the plantations, especially from those which occupy the higher slopes of the fans; there is also a steadily increasing area devoted to bananas. All these commodities are transported to Guayaquil, most of them by barge on the rivers.

The largest business of Guayaquil is the shipment of cacao, a product which has dominated Ecuador's foreign trade and internal finances since early in the nineteenth century. In some years cacao has made up more than 75 per cent of the value of all exports. The peak year was reached in 1916, the climb to that year having more or less kept pace with the gradual increase in the world demand for cacao. Ecuador has held a favored position in the world market, for its cacao is considered by manufacturers of chocolate candy to possess an especially desirable flavor. The planting of cacao, however, has always been on a speculative basis. A minimum of attention has been given to the cultivation of the trees, and little labor is needed except at the time of harvest. So great have been the returns from this constantly expanding industry—said to have amounted, in some years, to as much as 25 per cent on the investment—that not a few of the planters have been able to live in luxury in foreign cities, leaving the operation of their estates to paid managers, whose only care was to provide the owners with more income. In spite of the favored position of Ecuadorean cacao on the world market, the area devoted to this crop since 1916 has not been greatly increased, especially as more and more of the income has been spent outside the country instead of having been invested in new plantations.

During the last two decades Ecuador has dropped far back among the cacao producers of the world. Partly as a result of the traditional speculative system, partly as a result of the ravages of certain diseases of the cacao trees, production during the 1920's was much less than it had been before. In the period from 1909 to 1913 Ecuador was supplying nearly 16 per cent of the world's production; but in 1928 its share was only 4 per cent, and has not changed significantly since then. In 1938 Ecuador stood third among the Latin-American countries in cacao exports, accounting for 13 per cent of the Latin-American total. Depression in the cacao

business has been relieved only partly by the increase of coffee and other commodities, such as bananas; depression in cacao still spells financial difficulty for the country as a whole, since a major part of the government revenue continues to be derived either directly or indirectly from this one industry. Perhaps the experiments in rubber planting now being carried on may usher in a new period of speculative prosperity for this region.

In the last few years a small increase in cacao production has been noted, compensating for a drop in the market price. Perhaps this indicates that the losses due to the diseases of the cacao trees have been stabilized. The possibilities of expansion are still great, but the speculative nature of the industry remains its essential characteristic—and this does not suggest permanence or security.

ECUADOR AS A POLITICAL UNIT

Ecuador is still struggling with remoteness and with poverty of resources. Its petroleum and gold are not likely to bring wealth equal to that of either Venezuela or Colombia. As long as speculation in commercial agriculture is the rule, the wealth derived from this source will not be spread widely among the Ecuadoreans, and unless there should be a rapid increase in the population there is little likelihood of a change in this traditional system.

Solution of these difficulties is not aided by the notable separation within this small country of the two centers of politics and commerce. Quito and Guayaquil stand opposed to each other, and this opposition is only to a slight degree modified by the expensive railroad which, since 1908, has connected them, or almost connected them, for the railroad only reaches the bank of the Río Guayas opposite the city of Guayaquil.

Because of the failure to develop a state which is internally strong, the government at Quito has found itself again and again too weak to establish effective control over the more remote parts of the country. At the beginning of the period of independence internal strife in Quito resulted in the loss of what has become southern Colombia. Now it is the Oriente which may be detached. Communications over the high passes of the Andes are extremely difficult, and in the forested lowlands only the rivers provide routes of travel. Until recently, most of this eastern territory was claimed by all three of Ecuador's powerful neighbors—Brazil, Colombia, and Peru. Brazil proceeded to establish its western boundary with Colombia and Peru, leaving Ecuador out; and now Colombia and Peru have agreed on a boundary which follows the Río

Putumayo and which gives Colombia a corridor to the upper Amazon—a corridor, however, which is not passable by any overland route of travel (Map 32). Iquitos is without question a Peruvian town, but the territory south of the Río Putumayo and north of the Marañón is still claimed by both Ecuador and Peru.

Stories of vast wealth continue to trickle back across the mountains from the Oriente. The search for El Dorado, for enormously rich sources of precious metals and oil, has been pushed by the process of settlement to more and more remote places. If important mineral discoveries should occur before the boundary problems have been settled, the stage would be set for serious conflict. It is doubtful, however, whether Ecuador could, in any case, either hold or develop its eastern territory in the face of the encroachments of its more powerful neighbors.

5

REPÚBLICA DEL PERÚ

Total area, about 500,000 square miles (uncertain because of the unsettled dispute with Ecuador)

Total population, 6,762,881

Capital city, Lima; population, 450,000

Trade per capita:

Imports: $ 9.48
Exports: $12.48

Unit of currency, sol ($.47, gold content value)

Major commercial products in order of value:

petroleum	wool
cotton	lead
copper	hides and skins
sugar	coffee
gold	

Railroad mileage, 2,758

(The above statistics are for the year 1938.)

5

PERU

AFTER MORE than four hundred years, Peru, like Ecuador, is still struggling with the unsolved problems arising from the contact of two incompatible cultures. In Peru the Indians had built one of the great pre-Columbian civilizations of America—the Empire of the Incas. To Peru was directed one of the main currents of Spanish colonial conquest. The Indians and the Spaniards met and mixed, but they never were amalgamated into a coherent society. The patterns developed by the Spaniards were superimposed upon those developed by the Indians, but with little real blending between the two.

Nor are these racial and cultural contrasts the only elements of diversity in Peru. The national territory is divided into desert coast, mighty ranges of mountains, rainy and densely forested eastern slopes, and wet tropical plains. Furthermore, the significance of these contrasted parts in terms of human settlement has changed very greatly in the course of history. And additional diversity has come to Peru in modern times through the growth of an industrial society which contrasts strangely with the traditional Spanish society in the smaller towns and the rural districts.

Peru is still as much Indian as it is European. To understand the way of living of more than half of the people one must go far back to a study of the Inca civilization in the pre-Columbian period. For, always in the background of the growing industrial cities is the still unsolved discordance between Spaniards and Indians, a discordance which has

marked the Peruvian landscape and colored Peruvian problems since the two civilizations first came into contact with each other.

THE EMPIRE OF THE INCAS

The rise of the civilization of the Incas was, in itself, an extraordinary thing—an event overlooked by most North Americans because, unlike the history of the civilizations of Mesopotamia or Egypt, Inca history is not essential to an understanding of the main stream of Occidental culture. Only for some of the Andean peoples of South America—for the peoples of Ecuador, Peru, and Bolivia—is a knowledge of this Indian culture of compelling importance because of the numerous present conditions of life which can be traced back to Indian origins. The ancient civilizations of Mesopotamia, Egypt, India, and China all began in the highly productive valleys of great rivers, where closely knit and coherent societies originated partly through the necessity for the co-operative use of water. But the Incas built their civilization in a territory which would seem to be as unsuited to economic prosperity and political unity as any that could be imagined. From a center in a small intermont basin high in the Andes the lines of authority were extended far to the north and to the south over a land creased by profound canyons, and separated into compartments by gigantic, snow-capped ranges. In the land of the Incas, as one writer puts it, everything was inferior except man (67, p. 28). The achievement, considered in this light, assumes all the greater importance.

The extension of political control over the territory from northern Ecuador to Middle Chile and the successful administration of this area were accomplished by a relatively small ruling group. Actually, the name "Inca" was applied only to this ruling group which formed the hierarchy of administrators, and which surrounded the emperor himself, the Sapa Inca (68). The origin of these people, who formed the nucleus of the state, is shrouded in mystery and legend. Only during the reigns of the last nine emperors can the story of the gradual extension of power from the Cuzco[1] Basin be established with clarity—and this period lasted from about the end of the twelfth century to the third decade of the sixteenth century, when the Spaniards entered upon the scene. The first of the Inca conquests was the densely peopled Basin of Titicaca, where an earlier Indian civilization had already flourished

[1] The word Cuzco is the Quechuan word for navel, referring to the outline and sharply defined borders of the intermont basin.

and declined. The conquest of the peoples of the Peruvian coast was not a very difficult military feat, since these communities, being dependent on water for irrigation, were easily subject to attack from the highlands. The borders of the empire were extended southward to Middle Chile, southeastward to the edge of the Argentine plains near the present site of Tucumán, and northward to what is now the northern border of Ecuador (Map 4). The Incas never were successful in penetrating the forests of the eastern slopes or in conquering the forest tribes in the plains east of the Andes. The last Sapa Inca to rule the empire as a unit found great difficulty in carrying on his administration over so vast an extent of territory; in fact, he spent much of his time in the newly conquered northern part, making his secondary capital at Quito. Just before his death in 1523 or 1524 he divided the empire into a northern and a southern part, to be ruled over by two of his sons. Civil strife between these two broke out shortly before the arrival of the Spaniards in 1531.

To estimate the population of the Inca Empire is not easy, and anthropologists differ widely in their opinions on the matter. A leading authority (68) places the figure between sixteen and thirty-two million. Even if the lower figure is accepted, there were more people in the empire at the time of the Spanish conquest than there are in this same area today. The combined population of Ecuador, Peru, and Bolivia, according to the latest estimates, is still only a little over twelve million. How did so many people support themselves in this mountainous and arid land, and what caused so great a decline in population?

Culture of the Incas

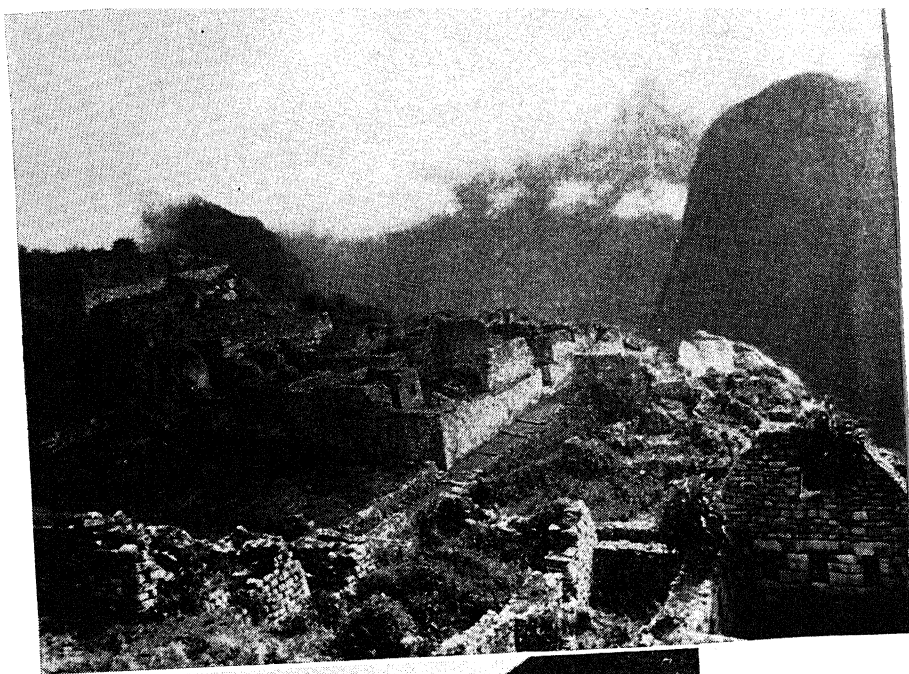
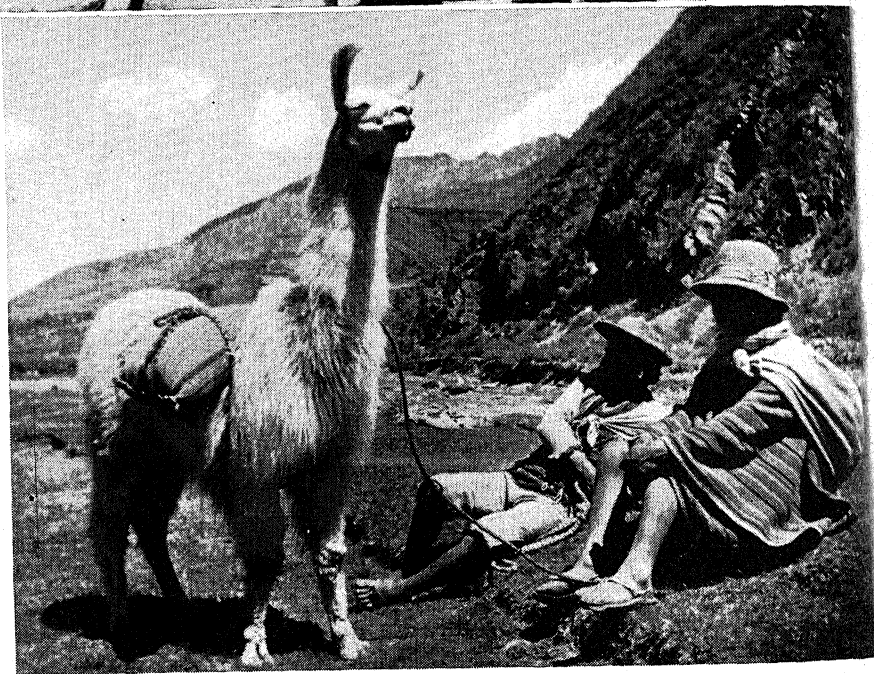
Whatever may have been the earlier diversity of people and ways of living in the territory conquered by the Incas, the benevolent and paternalistic rule from Cuzco minimized the chief differences and set a uniform stamp over all but the most recently invaded communities. The whole empire was divided into four parts, each served by one of the great Inca roads which focused on the capital city: with reference to Cuzco these parts lay to the north, the northwest, the southeast, and the south. Within each of these four parts the subjects of the Sapa Inca were systematically arranged in groups of standard sizes. Before the Inca conquest, the largest political unit was the *ayllu*, a village community of variable size which held its lands in common. The Inca recognized the family rather than the individual as the basic unit of the empire. Groups of families were administered as communities by appointed officials:

groups of ten, fifty, one hundred, five hundred, one thousand, ten thousand, and forty thousand families. The groups were kept at these approximate sizes by the resettlement of families in new colonies. This whole logical and systematic organization was responsible to and derived its authority from the Sapa Inca, who held complete power over the lives of every one of his subjects and in whom was vested the ownership of land.

In the state organized by the Incas the individual existed only as a part of a household; and the household existed only for the service of the state. Inca administration had as its chief function the maintenance of production and the distribution of surplus commodities. The state had no important contacts with people beyond the borders of the empire —there were no problems of foreign relations, but only problems of domestic production and supply. The Inca engineers increased the arable area by control of the water supply and by the construction of terraces (or *andenes*) on the valley sides. Just as wheat, barley, and rice formed the food bases of the ancient civilizations of Asia and Africa, maize was the basic food of the Incas. But it was supplemented by other foods. At the higher altitudes the hardy grain quinoa and potatoes were important. The former, combined with peppers, was used in a kind of soup; potatoes were used to produce *chuña*, a potato meal which is still one of the chief foods of the Andean Indians. The dried meat of llamas was also included in the diet of the ordinary people—fresh meat was generally restricted to the Inca and his family. In addition to these foods, the ordinary people had an alcoholic beverage made of maize—a kind of beer known as *chicha;* and they were addicted to the chewing of coca leaves mixed with clay. Both chicha and coca[2] are still consumed by the highland Indians from Ecuador to northern Chile.

The products of each community were divided at the discretion of the Inca administrators, into three parts. One part went to the priests of the sun; one part was used for the support of the Inca and his family; and one part was left for the support of the community. There was usually a surplus above the immediate needs of the Inca. This surplus was stored in warehouses and was available for distribution in any part of the empire where crops had failed.

The lives of individuals were closely and benevolently regulated under this system. There was no need for imagination, no need for ambition and initiative, no need to depart from the standard routine, no need to

[2] Not to be confused with cacao, the source of chocolate. Coca is a small shrub from which cocaine is extracted.

The capital of the mighty Inca Empire was Cuzco, the "city of gold," situated over 11,000 feet above sea level, with a population of 200,000. Architecturally, Cuzco today reveals much of its history: many of its buildings have walls of huge stones fitted together by the Incas; the imprint of the Spanish conquerors is seen in the beautiful churches, monasteries, and palaces. The upper picture

worry about poverty and hunger. Work was assigned by age groups, beginning with coca picking and other light work for people between sixteen and twenty, culminating in a period of maximum labor between twenty-five and fifty, and decreasing beyond fifty. Marriages were arranged by the authorities, leaving the individual only a slight range of choice. The Incas carefully preserved certain recreations; they set aside three days in every month for fairs at which each family could exchange its products for the products of other families. At these fairs no set standards of value were imposed, but each transaction was the result of a specially arranged barter. As in the case of most of the Indian fairs of both South America and Middle America, going to market was fully as much a social function as a commercial one.

The problem of communications within the empire was a major one. The roads which led in four directions out of Cuzco were paved, or in places cut out of the solid rock. Suspension bridges spanned some of the deep canyons. Since there were no wheeled vehicles and no domestic animals that men could ride, travel was entirely on foot, and the roads were designed accordingly. Communications were maintained by relays of runners—men specially trained from boyhood for this particular service.

The domestication of some of the native Andean animals was also a major achievement. This achievement becomes especially remarkable when we recall that all the other domestic animals of the world, except the reindeer, poultry, and possibly the dog, were domesticated in the grasslands of the Old World. The Indians of the Inca Empire had no poultry, no horses, no cattle, no sheep, no hogs, and no cats; they used the dog only as a pet, or in some cases for hunting purposes. But they did domesticate two closely related animals: the llama and the alpaca.

The llama remains even now one of the most important beasts of burden in the highlands of Peru and Bolivia. As a carrier he is by no means as efficient as the mule. Although gentle and easily handled, the llama has a remarkably stubborn disposition, for when he is tired or feels overloaded he will promptly lie down and resist all efforts to move him, even resorting to the unpleasant habit of spitting, camel-like, at those who come within range. He can carry no more than about one hundred pounds; and he must be driven at a leisurely pace, in a herd, grazing as he goes. A llama herd can cover little more than ten miles a day.

The smaller and less sturdy alpaca, a relative of the llama, is still used for its wool. Fine alpaca wool was the basis of the Inca textiles.

The artistic and technical achievements of the Incas were of a high order. The designing and weaving of textiles from alpaca wool and from cotton was one of their most notable skills. Anthropologists point out that the natives of Peru discovered and made use of almost every known technique of weaving. Their pottery was colorful and finely modeled, yet it was made without the use of a wheel. Like all other native American cultures, the Inca culture included no practical application of the circle—a geometric figure of which, however, they were not ignorant. The Inca engineers never made use of wheels, they never built towers, or columns, or keystone arches. Yet they were able to build suspension bridges, to construct long irrigation ditches over rugged surfaces, to terrace the mountain slopes, and to build massive walls with stones so closely fitted together that, without mortar, they have resisted the forces of destruction to the present day. The Incas were skilled workers in metals, and although they had no knowledge of iron, they did know how to make bronze from copper and tin. They had no written language, but they kept accounts in the form of knotted strings, known as *quipus*. Their decimal system of figuring was much less cumbersome than the Roman system used by the Spaniards, or even than the money system now in use in Great Britain. And their peculiar plaintive music is only just now being "discovered."

The Inca state may be described as a benevolent paternalism. To make use of other terms, such as "socialist" or "communist," with meanings derived from modern European forms is only to obscure the truly indigenous quality of the Inca way of living. In one fundamental way the Inca concepts differed essentially from the concepts of the Spanish conquerors. The Incas had only an elementary understanding of the idea of private property. To be sure, the family dwelling and its contents, together with the land on which it stood, was regarded as belonging to its occupants as long as they, themselves, desired to use it. But the native Peruvians had no understanding of the ownership of land for prestige or profit. Land, as such, had no value—its value was only in terms of what it could produce; the ownership of land being vested in the Sapa Inca, and earlier in the ayllu as a community, such ownership did not constitute a means to prestige. Nor did the Incas understand the concept of the exploitation of natural resources for personal gain. In all these basic ideas they differed radically from the people who conquered them; and in the years since the conquest the descendants of both groups have yet to find a common ground of understanding on these questions.

THE EUROPEAN IMPACT

The amazing story of the conquest of Peru by Francisco Pizarro and his little band of fewer than 200 men equipped with 27 horses is well known. Taking advantage of dissension among the rulers of the Empire, the Spaniards were able to complete the overthrow of the Incas in the comparatively brief period between January, 1531, and November, 1533, in which month the conquerors made their victorious entry into Cuzco. Once the leadership of the ruling group had been removed, the majority of the inhabitants, long accustomed to unquestioning obedience to central authority, easily accepted the new rulers.

Immediately after the conquest profound differences began to appear between the Spanish way of living and that of the Indians. These differences were reflected in the complete reorientation of the economic life which took place within a few years. The Spaniards were interested in their oversea connections, and as a result the coastal region was abruptly changed from a place remote from the center of political and economic activity to the place on which these activities focused. The longitudinal roads of the Incas were abandoned in favor of short transverse roads leading from various parts of the highlands to the nearest ports on the coast. Lima was founded in 1535, and, with its port Callao, assumed pre-eminence as the primary settlement center from which the Spanish culture was spread over almost all of western South America. Lima became the center of political power, the center of social life, the center of commerce—a city of fabulous wealth (Map 5).

Contrasts in Land Tenure and Agricultural Systems

One of the first methods used by the Spaniards to collect wealth from the Indian communities was the system known as the *encomienda*. This system was based on the theory that conquered peoples should pay tribute to the conquerors. The Spanish crown delegated the right to receive this tribute from a specific group of Indian communities to certain of the officers of the army and to others who could establish their right to such a claim.

The encomienda, which carried with it no right to the ownership of the land, was scarcely enough for the conquerors of Peru. Few of the men under Pizarro, few even of the officers, were already members of the Spanish aristocracy: Pizarro himself had been a swineherd on one of the large feudal estates of Spain. Such adventurers passionately desired the opportunity to acquire land and so to gain a position of prestige. Grants

of land by the Spanish crown, therefore, soon led to the creation of vast private estates, and to the formation of a new aristocracy. But the ownership of land which brought prestige did not also bring economic security to the owner unless that land included a supply of Indian workers, for under the Spanish system production of any sort, whether in the mines or on the fields, was dependent on the labor of the native peoples.

On estates, or *haciendas*, which measured thousands of square miles in area, the more remote districts could not be brought under the effective supervision of the owner or his managers. In the more accessible parts of the haciendas the owners made use of the Indian workers to raise commercial crops; but in the more distant places the Indian communities continued to use the land in the traditional way, only paying a kind of rent to the new owner. When properties changed hands the Indian communities were transferred as a part of the land; in fact, it was the presence of the Indians which gave the land its value. In this way the two contrasted systems of land tenure—the traditional communal system of the Indians and the system of private property introduced by the Spaniards—continued to exist together in the same area.

The European conquest also resulted in a serious decrease in the food supply. To be sure, the introduction of cattle made habitable large areas of high mountain grassland which had remained without permanent settlement in Inca times. But great numbers of Indians were removed from the coastal oases or from the highland agricultural centers for work in the mines, and since most of the latter were at very high altitudes this work proved very exhausting and many of the workers never returned to their homes. The irrigation systems which the Inca engineers had built and the Indian communities had maintained were permitted to break down through neglect. The increased habitability of the highlands through the introduction of cattle did not compensate for this loss of agricultural productivity at the lower altitudes, for the use of land for pasture does not produce as much food per square mile as does the cultivation of crops, especially with the intensive methods which the Incas had developed.

Population Changes

The decrease in the food supply was accompanied by an enormous decline in the Indian population. Great numbers of the Indians died from overwork in the mines and from epidemics of smallpox and measles. About fifty years after the arrival of the Spaniards, in 1580, the number of

Indian inhabitants in the territory of the Inca Empire had been reduced by about a third. The population has not yet returned to the density of the pre-Columbian period.

The present Peruvian population is still predominantly Indian. At least 50 per cent of the inhabitants of this country are of unmixed Indian ancestry and continue to speak the Quechuan language and to live as their predecessors have lived for centuries. There is a mestizo population which is estimated as about 33 per cent. Perhaps 5 per cent are Negroes, Chinese, and Japanese. Only about 12 per cent are pure Europeans, most of whom are Spanish.

THE HIGHLANDS

The Indian element is strongest in the highlands. Many of the clusters of people in this region are almost pure Indian, perhaps with a small minority of white or mestizo landowners, storekeepers, government officials, and priests. There are, however, some communities which are supported by mining activities, and others which are supported by commercial agriculture. The population of highland Peru is Indian in terms of race and Indian in terms of the attitudes and techniques of living. Let us look more closely at the pattern of settlement, and at the ways the settlement has been attached to the land.

Surface Features of the Highlands

Throughout most of highland Peru three fundamental surface elements combine to make up the mountain scene. These three elements are in some ways similar to the elements which form the Cordillera Oriental of Colombia—a range which, like the ranges of highland Peru, is composed of folded and faulted geologic structures. The first of these elements is a high-level surface of gentle slopes. Above this surface stands the second element—towering groups and ranges of high peaks. And below the high-level surface is the third element—profound canyons with sides so steep that to climb up or down is extremely difficult. The westernmost rim of high ranges which overlooks the Pacific coast forms the continental divide; the tributaries of the Amazon rise in the highest areas, cross the high-level surface through broad valleys with low gradients, and descend turbulently through the canyons as they follow devious routes through the body of the highlands toward the eastern plains.

The high-level surface is one of the distinctive features of the Peruvian Andes. In the Cordillera Oriental of Colombia only a few basins of the

NORTHERN PERU
SURFACE CONFIGURATION
LOWLAND
INTERMONT BASINS
ANDES
PAITA
PIURA
RÍO PIURA
ECUADOR
PONGO DE MANSERICHE
CHICLAYO
PIMENTEL
ETEN
PACASMAYO
CAJAMARCA
MOYOBAMBA
YURIMAGUAS
OCEAN
TRUJILLO
SALAVERRY
RÍO MARAÑON
RÍO HUALLAGA
RÍO UCAYALI
CHIMBOTE
SAMANCO
CASMA
PACIFIC
HUARAS
HUARMEY
RÍO SANTA
HUANUCO
PATIVILCA
POZUZO
N
CERRO DE PASCO
PUERTO BERMUDEZ
LA MERCED
TARMA
SCALE
0
100
MILES
CALLAO
LIMA
OROYA

MAP 24

SOUTHERN PERU
SURFACE CONFIGURATION
LOWLAND
INTERMONT BASINS
COASTAL RANGE
ANDES
CHIEF VOLCANIC PEAK
CERRO DE PASCO
LIMA
CALLAO
RIO RIMAC
RIO MANTARO
TARMA
LA MERCED
OROYA
RIO PERENE
JAUJA
HUANCAYO
RIO UCAYALI
PISCO
OCEAN
PACIFIC
HUANCAVELICA
ICA
AYACUCHO
RIO APURIMAC
RIO URUBAMBA
SANTA ANA
GORGE OF TORONTOY
ANTA
ABANCAY
CUZCO
SICUANI
AREQUIPA
MATARANI
MOLLENDO
EL MISTI
LAKE TITICACA
PUNO
SCALE
MILES
0
100
N
13°
11°
77°
15°
75°
17°
73°
71°
69°

MAP 25

central area in Cundinamarca and Boyacá are preserved from the active headward cutting of the streams—and the surface in this region is only between eight and nine thousand feet above the sea. In Peru the high-level surface is much more extensive, and it lies between ten and fifteen thousand feet in altitude. The valleys of this area are broad, the streams sluggish and meandering. Long-continued denudation has stripped the cover of loose material even from the gentle hillsides, so that much of the highland surface is composed of naked rock, or rock only thinly veneered with waste material. Many of the valley basins are filled to their rock rims with smooth sheets of gravel washed down from the bordering slopes. Because of the great elevation, most of this high-level surface is beyond the range of agricultural settlement, except in the deeper valley basins which lie somewhat below the general upland level but above the heads of the canyons.

The groups and ranges of high peaks which form the second element of the Peruvian landscape stand on the high-level surface as on a platform. These are the only parts of the Peruvian mountains that exhibit truly alpine forms. The highest of the summits are between eighteen and twenty thousand feet above sea level. At the latitude of Lima, the snow line is about 16,500 feet in elevation; in southern Peru the snow line is between 17,000 and 19,000 feet. On some of the ranges above the snow line small remnant glaciers exist even today, but during the glacial period ice action was much more vigorous than now and resulted in the creation, at the higher altitudes, of typical alpine forms—cols, horns, cirques, and troughlike valleys, with strings of little clear mountain lakes and knobby moraines. Most of the ranges run in a northwest-southeast direction, but they are not continuous, and there are many ranges which depart from the normal trend to cross diagonally from southwest to northeast.

The classical description of these ranges, frequently repeated, has unduly simplified the pattern of arrangement. It is definitely incorrect to describe the Peruvian Andes as composed of three or four parallel cordilleras, like the Andes of Colombia. On many maps the stream divides are shown as mountain ranges, and places where many streams rise are represented as mountain "knots." The facts are quite different. Actually, the several ranges are not continuous and are generally arranged in echelon with no connection between the separate rows of peaks. The idea of the mountain knot should be dropped entirely from the descriptions of the Andes. The position of the highest ranges can be seen on the maps of vegetation, which show the areas above the snow line (Maps 26 and 27).

The canyons which have been cut below the high-level surface are tremendous. Some of them are nearly twice as deep as the Grand Canyon of the Colorado in southwestern United States. In many places the rivers pass through narrow gorges with vertical rock walls; in a few spots along the canyon bottoms there are narrow ribbons of terrace land, or small alluvial cones where tributary streams reach the main valley. But because of the impossibility of following the rivers either upstream or downstream and because of the difficulty of climbing the canyon walls to the high-level surface far above, these little valley flats on the canyon bottoms are among the most isolated spots in the country.

Except for the deep canyons and the alpine forms of a few of the highest peaks, the roughest surfaces in the Peruvian Andes are to be found on the wet eastern slopes. Here the heavy rains support many streams, and as a result these eastern slopes have been cut into a maze of narrow ridges and ravines. From the standpoint of difficulty of travel, it is these eastern slopes rather than the main body of the highlands that form the chief barrier.

The zone of the much dissected eastern slopes extends farthest westward into the highlands along the Ecuadorean border, close to the main channel of the Amazon (or its headwater—the Marañón). In one place in southern Ecuador the continental divide has been pushed within thirty miles of the Pacific Ocean. Along the border of Ecuador and Peru it is possible to cross from the Pacific to the Amazon lowlands with a climb of only a little over seven thousand feet. In southern Peru the zone of dissected eastern slopes is much narrower. From the crest of the giant range which stands northeast of Lake Titicaca to the eastern base of the highlands there is one very steep drop from over twenty thousand feet to less than one thousand feet.

Volcanic activity in present-day Peru is limited to the southern part of the highlands. Here a fourth element is added to the complex of surface forms. South of latitude 14° S. great cone-shaped volcanoes appear and continue southward along the western side of Lake Titicaca and along the border of Chile and Bolivia. The best known of these great volcanoes is El Misti, which overlooks the city of Arequipa. In this southern part of the Peruvian Highlands the high-level surface is deeply covered with falls of ash and flows of lava.

Climate and Vegetation of the Highlands

The climatic conditions of the highlands of Peru are as varied as the surface features. With increasing distance from the equator the various

altitude limits, including the snow line, rise gradually to a maximum elevation at about latitude 20° S. The upper limits of the various zones, therefore, are higher in southern Peru than they are in Ecuador and Colombia. The upper limit of crops, for instance, is about fourteen thousand feet above sea level between Cuzco and Arequipa about latitude 16° S.; and in this same region the snow line is between seventeen and nineteen thousand feet. The annual range of temperature is somewhat greater than it is nearer the equator; Cuzco, for example, has a range of about seven degrees, as compared with three tenths of a degree at Quito in Ecuador. The range between day and night is still greater than the annual range—at the higher altitudes freezing temperatures may be expected in every month of the year. Also, during the day there is a very great difference between shade temperatures and temperatures in places exposed to the sun. Anyone who experiences the penetrating cold of an Andean night can easily comprehend the primitive instinct to worship the sun.

High altitude exerts a limiting effect on human energy. Whether because of decreased pressure, lack of oxygen, or other factors, physical labor at altitudes over twelve thousand feet is not easy. Mountain sickness, known in Peru as *soroche*, produces a feeling of nausea and dizziness and may lead to serious results, especially for persons with weak hearts. Respiratory diseases at these altitudes are fatal. Since so much of Peru lies near or above fifteen thousand feet, altitude is of definite importance in the understanding of human distribution.

Unlike the Andes of Ecuador and Colombia which receive abundant rain over most of their area, the Peruvian Andes include conditions ranging all the way from very wet to very dry (Map 9). Throughout the Peruvian Highlands the rains come from October to April. But the amount received is adequate for agriculture without irrigation only on the northern and eastern sides; the western side bordering the coast is very dry, as are also many of the deeper canyons. Within the highland region there are vertical zones based on temperature differences; but these zones are diversified by variations of the rainfall factor. For example, the relative positions of the snow line and the tree line vary with the rainfall; snow lines are generally higher in dry regions whereas tree lines are lower; the zone of high grasslands is, therefore, widest in dry areas and narrowest in wet areas. In certain parts of the wet eastern slopes the forest ascends almost to the snow line; but in most parts of highland Peru the grasses and shrubs above the tree line are the most widespread and characteristic of the vegetation forms (Maps 26 and 27).

Vegetation distribution in the Peruvian Highlands can be shown in considerable detail, thanks to the work of Weberbauer.[3] Forests occur only in the east and north. The tropical rain forest or selva ascends the lower eastern slopes, but higher up it gives way to a "mountain forest," composed of a dense growth of smaller trees—a formation which the Peruvians and Bolivians call the *Ceja de Montaña*, or "eyebrow of the forest." The upper limit of trees on these slopes in most places lies about eleven thousand feet above sea level. North of Cajamarca the mountain forest widens out to cover most of the highlands along the Ecuadorean border. In drier spots within the highlands and on the western slopes the desert vegetation known as xerophytic shrub makes its appearance. The greater part of the highlands, however, is covered with various kinds of grasses and shrubs, which become increasingly xerophytic toward the south. In the north the "mountain grassland" is similar to the vegetation type known as the *páramos* in Ecuador and Colombia, being composed of bunch grasses mixed with taller plants and brush. The vegetation known as the *puna* appears first on the western side a little north of Huarás, but extends over most of the width of the Andes in the south. In this formation the bunch grasses are more widely spaced than in the mountain grassland of the north, and other plants associated with the grasses are low, without stalks, and with hairy leaves. The puna becomes even more xerophytic in the zone of volcanic activity in the south, where the tola bush, a hardy, resinous plant, is able to maintain itself on a land which suffers from low rainfall, porous ash soil, and continuously low temperatures.

Population and Settlement in the Highlands

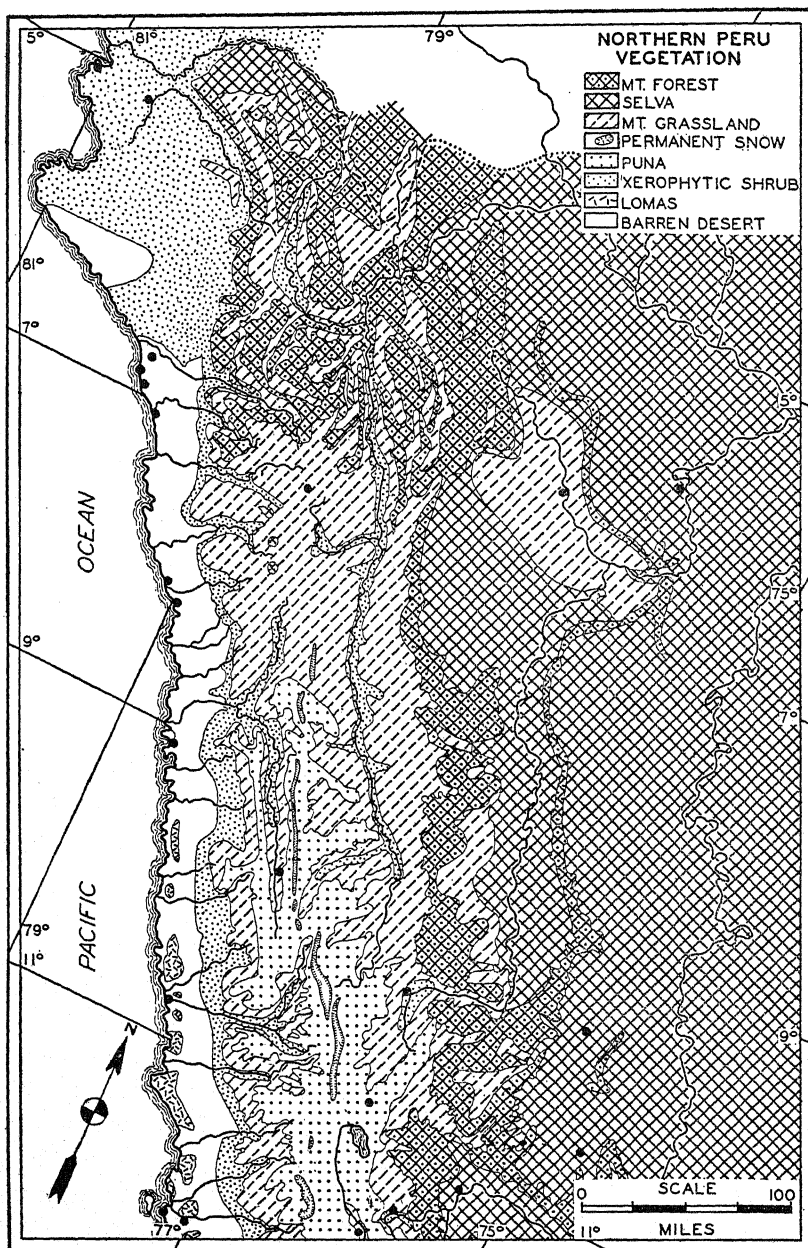
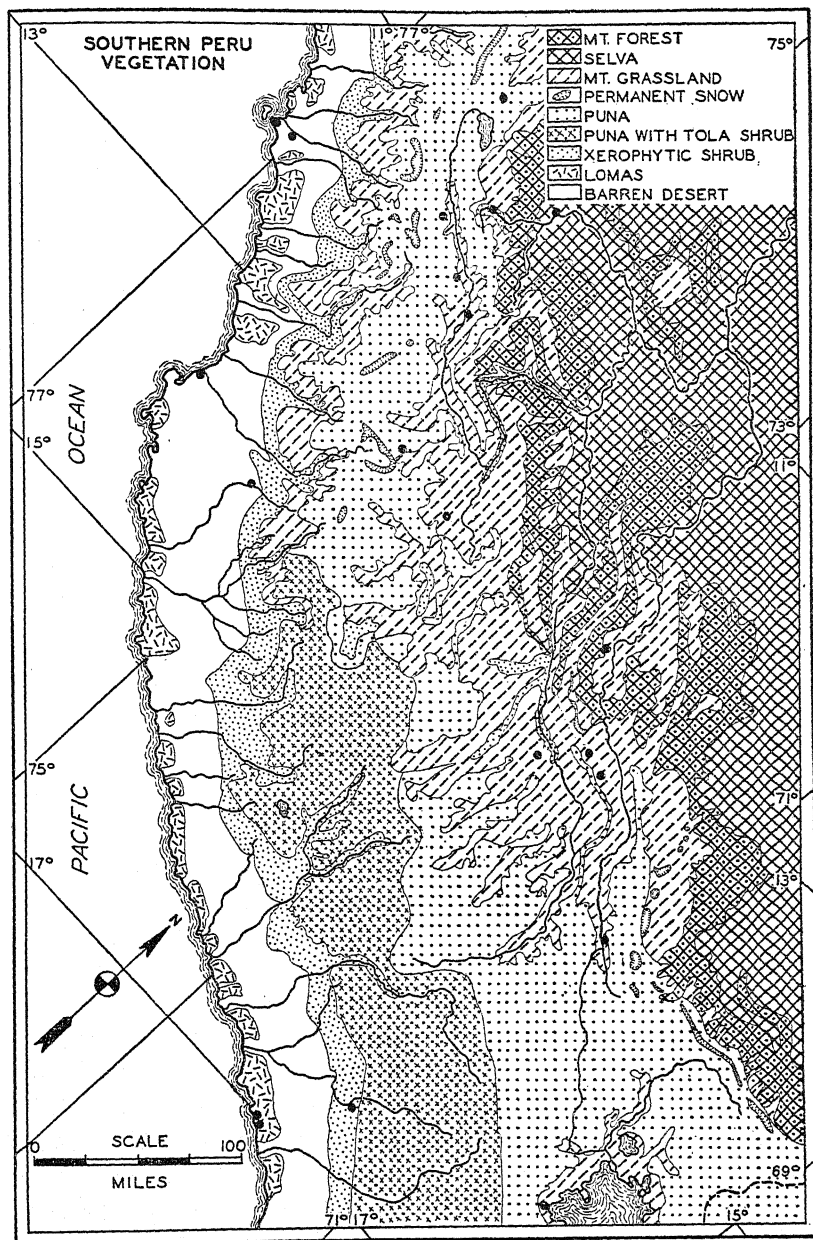
The highlands of Peru, like those of Ecuador, have long been occupied by Indian communities. The Quechua-speaking tribes were clustered in spots of dense population before the days of the Inca conquest, and the same population pattern has survived the centuries of Inca rule and the centuries of Spanish rule. Here in the Peruvian mountains the concentrations of people are stable and permanent.

To a remarkable degree the Indians of the highland communities remain stolidly indifferent to influences from outside. Crops are planted and harvested somewhat less effectively than in the days when the agricultural activities were supervised by the Inca administrators. But dur-

[3] Maps 26 and 27 are based largely on A. Weberbauer, "Die Vegetationskarte der peruanischen Anden zwischen 5° und 17° s. Br.," *Petermann's Mitteilungen*, Vol. 68, 1922: 89–91, and 120–121.

NORTHERN PERU
VEGETATION
MT. FOREST
SELVA
MT. GRASSLAND
PERMANENT SNOW
PUNA
XEROPHYTIC SHRUB
LOMAS
BARREN DESERT
PACIFIC
OCEAN
N
SCALE
0
100
MILES
5°
81°
79°
7°
9°
11°
77°
75°

Map 26

SOUTHERN PERU
VEGETATION
MT. FOREST
SELVA
MT. GRASSLAND
PERMANENT SNOW
PUNA
PUNA WITH TOLA SHRUB
XEROPHYTIC SHRUB
LOMAS
BARREN DESERT
PACIFIC
OCEAN
SCALE
0
100
MILES
N
13°
11°
77°
75°
15°
73°
71°
17°
69°

Map 27

ing the last few decades, when the Peruvian government has made a real attempt to introduce more efficient agricultural methods, the Indians have remained unresponsive. In the more remote parts of the country the land is still prepared for planting in the traditional Indian manner with a small foot plow, which requires much more human effort for the same results than is necessary where such implements as the hoe or the forked stick drawn by oxen have been adopted from the Europeans. Grain is winnowed, too, by tossing it in the wind, or threshed by driving animals over a threshing floor. Any program which has as its objective the raising of the economic status of the highland Indians faces the problem of overcoming resistance to the introduction of more efficient agricultural and pastoral techniques.

The kinds of crops which are produced depend mostly on altitude. Because all the altitude zones are higher in Peru than they are nearer the equator, the upper limits of the various crops are found at greater elevations than in Ecuador and Colombia. The crop which reaches the upper limit of all agriculture is the potato, grown to approximately 14,000 feet in Peru. The zone of grains lies between 10,000 and 13,000 feet, with approximate upper limits for maize at 11,000, for wheat at 12,000, and for barley at 13,000. Sugar cane is grown at altitudes up to 8,000 feet, and bananas and oranges occur up to 6,000 feet.

Above the upper limit of agriculture is the puna. Unlike the páramos of Colombia, the Peruvian puna was habitable for the native peoples because they possessed llamas and alpacas. Unlike the páramos, also, the puna is too poor a grazing land to support cattle, but after the Spanish conquest sheep were introduced into this part of the Andes. In southern Peru, the high Indian communities have adopted a purely pastoral economy and have established remote commercial contacts with the outside world through exports of wool.

Most of the products of the Peruvian Highlands, however, are consumed locally. Mines supply the larger proportion of the commodities which are sent out of the region, and a few of the highland settlements are the unstable and temporary kind associated with mineral industries. Where railroad lines have penetrated the mountains, a few agricultural and pastoral commodities are brought down to the coast. The wool of southern Peru is sent out of the highlands over the railroad to Arequipa and Mollendo (Map 29); the wheat of the valley basin of Huancayo is sent to Lima over the Central Railroad. In some places food products are transported over rough trails to near-by mining communities. With these exceptions, the highland populations are commercially inert.

Concentrations of Settlement in the Northern Andes of Peru

The northernmost of the clusters of people in highland Peru centers about the town of Cajamarca (Maps 24, 28, and 30). The northern part of this area of concentrated settlement is occupied by Indian farmers. In small valley basins along tributaries to the Río Marañón at elevations between 7,800 and 10,500 feet, the land is used for the production of crops for local use—chiefly maize and alfalfa. The southern part of this area, however, has been occupied recently as a result of mining activities. A North American mining company, the second largest in Peru, has opened up several deposits of gold, silver, and copper, and supplies its smelters with coal from local sources. Automobile roads have been built into the mountains from the ports of Salaverry and Pacasmayo; the road from Salaverry now reaches the mine of Pataz which was the chief source of gold in Peru during the middle 1930's. Cajamarca, with about 15,000 inhabitants, remains the chief town of the district.

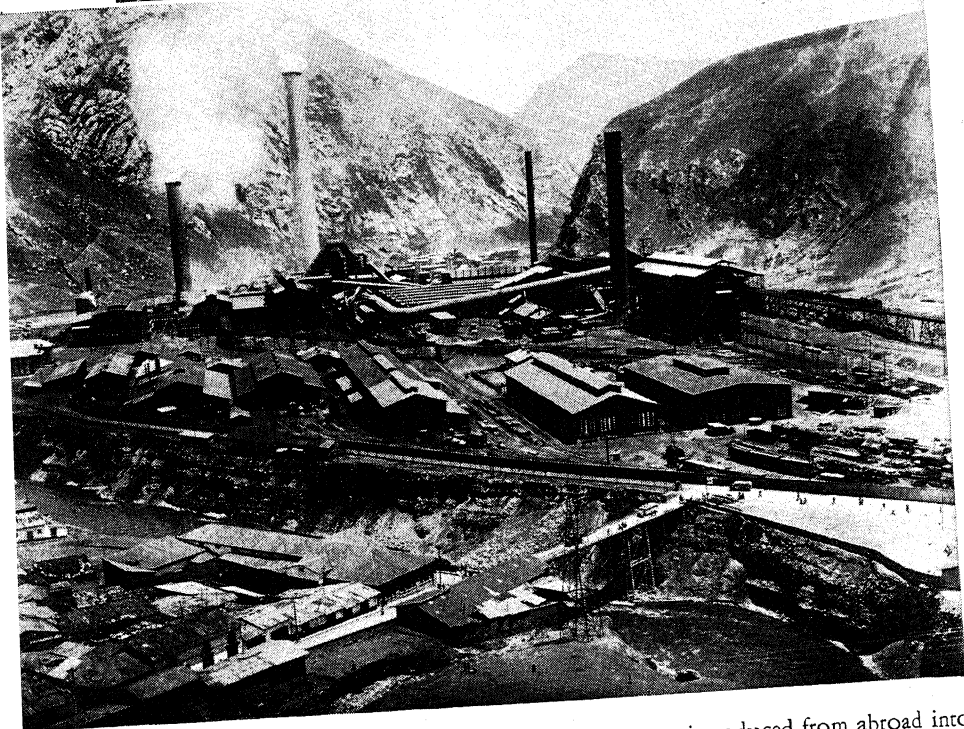
South of the cluster of people around Cajamarca the next area of concentrated settlement occupies the valley of the Río Santa, centering on the Indian town of Huarás (20,000 inhabitants). The Río Santa rises in the high country north of Cerro de Pasco, and after crossing stretches of the high-level surface, plunges abruptly into a deep valley on the Pacific side of the continental divide. Some of the highest ranges of Peru overlook the Río Santa Valley from the northeast. In a distance of a hundred miles, the river descends from nearly 14,000 feet to about 7,000 feet above sea level. The first agricultural lands appear a little below 13,000 feet; but most of the villages are between 9,000 and 10,000 feet, near Huarás. The population is predominantly Indian; and the crops range from potatoes and barley, at the higher altitudes, to maize, alfalfa, and sugar cane at lower altitudes. A railroad from Chimbote reaches the lower part of the valley, and the sugar finds its way out through that port; but most of the district is devoted to subsistence agriculture. There is, however, a small current of trade upvalley to supply the large mining communities around Cerro de Pasco.

Unlike the valley of the Río Santa, the much deeper and larger canyon of the Río Marañón is scantily occupied. Only a few isolated haciendas are to be found, generally where small bits of gently sloping land have been built of alluvium at the mouths of tributary valleys. The sugar cane raised there is converted into sugar brandy, or *aguardiente*, for only through the sale of a product with a high value per unit of weight can the landowners make a profit in spite of costly transportation.

Mining Centers of the Central Andes

In the high country around Cerro de Pasco several major rivers have their sources. The Marañón, the Huallaga, and the Mantaro, all start from this area on their separate courses to the Amazon. Although the classic descriptions of the Peruvian mountains call this headwater area a "knot" where several continuous ranges of cordillera are supposed to converge, actually it is composed of a vast extent of the high-level surface surmounted by only a few isolated peaks, and bounded on the east and west by separate, off-set ranges of high mountains.

Cerro de Pasco is located almost on the watershed between the Huallaga and the Mantaro, at an elevation of 14,700 feet. Now a town of 18,000 inhabitants, it forms the center of one of the oldest and most famous of the mining communities of South America. The silver ores near Cerro de Pasco were first discovered in 1630, and about thirty years thereafter Peru took the lead among the world's silver producers. Although the mines of Cerro de Pasco continued to yield well, Peru was able to maintain this lead only from 1661 to 1680, when it was surpassed by Mexico. For hundreds of years the silver ores were reduced in crude smelters near the mines, and silver bars were carried, over a steep trail, two hundred miles to the city of Lima. Late in the nineteenth century, when the silver ores were nearing exhaustion, Cerro de Pasco began to decline in population, for at this altitude no other support for so large a concentration of people could be found.

The railroad which now climbs up the valley of the Río Rimac from Lima and taps this great mining region around Cerro de Pasco, as well as near-by agricultural areas, is one of the most remarkable examples of mountain railroad building in the world. This line surveyed by Henry Meiggs, a North American engineer, is of standard gauge (4 ft., 8½ in.) and maintains a 4 per cent grade without use of rack or cable. It clings to the sides of almost vertical walls, passing through many tunnels and over many bridges on the way to Oroya (Map 28). In places the canyon of the Rimac is too narrow to allow the maintenance of the grade by ordinary means; spiral tunnels within the mountain, or a series of switch-backs over which the trains move alternately forward and back are among the devices used to gain altitude. In one place the road is built in the bed of the stream, which is diverted through a boring to one side. The highest point on the main line is reached in a tunnel through the divide at an elevation of 15,665 feet. A branch line to connect with the copper mines at Morococha reaches the highest elevation attained by any stan-

It was not till the Spanish conquest that oxen were introduced from abroad into Peruvian economy. The Indians shown in the upper picture plowing with oxen are working on an hacienda, using their landlord's equipment; they cultivate their own subsistence farms by more primitive methods. (Courtesy of the Grace Line.) In the lower picture is evidence of a different kind of influence exerted by foreigners on Peruvian economy — that of capital needed for buildings ... This view is of copper smelters at Oroya, belonging to the ... American Union.)

The beautifully symmetrical cone shown in the upper picture is the volcano El Misti, rising 19,000 feet above sea level. At its base is Arequipa, once a little halfway station on the old Inca trail between Cuzco and the coast, but now the third city in size in all Peru. It is a gateway to the southern highlands and the Basin of Lake Titicaca. Hither is brought for shipment abroad the wool of sheep [illegible] from all of southern Peru. In the lower picture is a market scene in

dard-gauge railroad in the world—15,865 feet. Construction on the main line was started in 1870, but it did not reach Oroya until 1893. Since then it has been extended northward to Cerro de Pasco, and beyond to the coal mines at Goyllarisquisga. The line has also been extended southward from Oroya to Jauja and Huancayo (Maps 28 and 29).

Early in the present century a mining corporation was organized to take over 941 mineral claims in the vicinity of Cerro de Pasco. The venture was a highly speculative one, especially as the installation of modern machinery, the construction of the railroad from Oroya, and other necessary developments cost about $25,000,000. Yet the corporation has prospered because it can exploit a variety of ores, some of them never before of much value. Cerro de Pasco was reborn, and has again become the center of Peru's chief mining area. The Indian laboring population has been trained to carry on the skilled work demanded in the mines and smelters. The most important mineral is copper, but in addition the corporation has also developed the production of silver, gold, lead, zinc, and bismuth. In recent years Peru has become the leading exporter of bismuth, a mineral which is now recovered from the flue dust of the Cerro de Pasco copper smelter. The corporation also owns and operates the coal mines at Goyllarisquisga, from which a low-grade fuel is taken for use in the smelters.

Other mining companies in this part of Peru produce smaller quantities of various minerals. From the mines at Minasragra, located more than 16,500 feet above sea level near Cerro de Pasco, comes about 80 per cent of the world's supply of vanadium. Among the other enterprises, the old quicksilver mines at Huancavelica should be mentioned. During the colonial period these mines were of very great importance, but since 1850 they have been closed and the community has declined in population.

Agricultural Centers of the Central Andes

South of Cerro de Pasco the Río Mantaro descends through a series of narrow valley basins which lie somewhat below the high-level surface. Oroya, a smelter town and junction of railroad lines and roads, occupies one of the smaller basins. Farther downstream is the large basin of Huancayo, some forty miles long by ten or twelve miles wide and located about eleven thousand feet above sea level. In this basin there is a relatively dense population of Indian farmers, centering on the towns of Jauja and Huancayo (Maps 25 and 29). Because of the accessibility of this basin to Lima and to the near-by mining communities, its agriculture

NORTHERN PERU
LAND USE
SHIFTING CULTIVATION
SEDENTARY SUBSISTENCE AGRICULTURE
LIVESTOCK RANCHING WITHOUT AGRICULTURE
IRRIGATED AREAS (OASES)
PERMANENT SNOW
COAL
MINERALS
AU GOLD
CU COPPER
V VANADIUM
PACIFIC
OCEAN
CU
AU
PATAZ
GOYLLARISQUISGA
MINASRAGRA
V
CU
CERRO DE PASCO
CU
MOROCOCHA
AU
CU
CU
SCALE
0
100
MILES
N
5°
81°
79°
77°
7°
9°
11°
75°

Map 28

SOUTHERN PERU
LAND USE
SHIFTING CULTIVATION
SEDENTARY SUBSISTENCE AGRICULTURE
LIVESTOCK RANCHING WITHOUT AGRICULTURE
IRRIGATED AREAS (OASES)
PERMANENT SNOW
WHEAT
MINERALS
Au GOLD
Cu COPPER
Hg MERCURY
PACIFIC
OCEAN
SCALE
0
100
MILES
N
13°
77°
15°
75°
17°
71°
11°
73°
69°
Au
Cu
Hg

MAP 29

has become predominantly commercial. People of European or mestizo origin own most of the arable land. The labor is performed by Indians under the direction of overseers. The Huancayo Basin produces about 40 per cent of the Peruvian wheat crop, most of which is sent by rail to Lima where it is consumed by the wealthier urban people. Maize for the local food supply and barley, both for local use and for shipment to Lima, are also grown. Huancayo is now a town of some twenty thousand inhabitants.

This central section of the Peruvian Andes is one of the few parts of Latin America where the political divisions fail to show a simple relation to the clusters of people. The two Peruvian provinces of Junín and Huancavelica (Map 31) cut through the zone of concentrated settlement centering on Huancayo. Apparently these political units were formed by the Spaniards around the mining centers of Cerro de Pasco and Huancavelica, and the dense Indian populations, which were politically inactive, were disregarded. The situation is similar to those found where international boundaries cut through centers of Indian settlement, as between Colombia and Venezuela, Ecuador and Colombia, and, farther south, between Peru and Bolivia. This peculiarity in the political pattern is an interesting reflection of the unresolved impact of the two fundamentally different cultures, for the political and administrative divisions of the Europeans were applied to the land without reference to the pattern of Indian settlement, and in these few instances happened to cut directly across areas of dense population. Later, we shall come upon a similar situation in the central area of Mexico.

Population Clusters of the Southern Andes of Peru

Between Huancayo and Cuzco is one of the most rugged parts of the Peruvian Highlands. The trail which connects these two places descends four times to below 6,500 feet and ascends four times to passes above 13,000 feet. Small concentrations of people, as around Abancay (Maps 29 and 31), live in isolation, raising the subsistence crops appropriate to the altitudes of their lands. As one approaches Cuzco, however, the number of small villages increases, for Cuzco has long been the center of one of the most densely populated parts of the Peruvian Andes.

There are two major concentrations of settlement in the southern part of the Peruvian Highlands. Cuzco itself, a city of about 40,000 people, occupies the extremity of a small basin some nine miles south of the Urubamba Valley and separated from that valley by a gorge; the level to

NORTHERN PERU
POPULATION
URBAN
MORE THAN 100,000
LESS THAN 100,000
RURAL
EACH DOT 1,000
ECUADOR
PIURA
LAMBAYEQUE
CAJAMARCA
AMAZONAS
SAN MARTÍN
LIBERTAD
LORETO
ANCASH
HUÁNUCO
LIMA
JUNÍN
OCEAN
PACIFIC
N
SCALE
0
100
MILES
5°
79°
81°
7°
9°
11°
75°

MAP 30

SOUTHERN PERU
POPULATION
URBAN
MORE THAN 100,000
LESS THAN 100,000
RURAL
EACH DOT 1,000
LIMA
HUÁNUCO
JUNÍN
LORETO
ICA
HUANCAVELICA
OCEAN
PACIFIC
APURÍMAC
CUZCO
MADRE DE DIOS
AYACUCHO
AREQUIPA
PUNO
MOQUEGUA
SCALE
MILES
0
100
13°
11°
77°
15°
75°
17°
73°
71°
69°
N

Map 31

region of southern Peru at the wool market of Arequipa, and shipped out through the port of Mollendo.

The Indian shepherds, themselves, make small profit from this trade. They are essentially subsistence pastoralists, who manage to support themselves from their herds. They use the wool of both sheep and llamas to spin thread and to make their own clothing; they derive most of their food supply from the meat of these animals; they use the dried dung of the llamas as a fuel; and they make use of the llama to transport the products demanded by the landlords.

THE EASTERN BORDER VALLEYS AND THE MONTAÑA

Quite different from the relatively stable and unchanging Indian communities of the highlands are the small settlements in the Eastern Border Valleys of the Andes and on the eastern plains or *Montaña*. Few of these eastern clusters of people have proved stable; although the land is described as a paradise in terms of its climate and the productivity of its soils, the difficulty of access to it has defeated efforts to bring it into effective use.

The Land

The region we are considering is one which contains so many difficulties of travel that it, rather than the higher country to the southwest, forms the chief barrier to trans-Andean communication. The half of Peru's total national territory which lies east of the mountains is effectively utilized in only a few scattered spots.

This eastern part of Peru is a land of heavy rainfall and dense forests. In the lowlands the selva makes travel all but impossible, except on the rivers. Fortunately, ocean steamers which draw less than 14 feet can ascend the Amazon all the way to Iquitos in eastern Peru, and launches and canoes, and now airplanes, follow the winding courses of the streams along the mountain border. Where the forest invades the lower slopes of the Andes and the rivers are no longer navigable, travel must take to the steep, slippery mountain trails. Only in the open, grass-covered country above the forest (Maps 26 and 27) can trails be maintained without almost constant labor.

The vegetation of these eastern slopes is quite varied. Even within the area mapped as selva, the slopes facing toward the sun are, in many localities, too dry to support anything but brush or coarse grasses. In other places the dense forest is interrupted by savannas with scattered

stunted trees—a vegetation type which commonly indicates a sandy, porous soil. One of the largest of these openings appears on the map (Map 26), near Moyobamba.

These eastern Andean slopes are intricately dissected, especially at lower altitudes. The valleys are generally narrow with steep sides; the divides between streams are sharply crested. The slopes merge with the plains through a zone of cuestas and trellis drainage; beyond the outermost cuesta only a few low hills interrupt the prevailing flatness of the country. The great rivers which drain the highlands emerge from the mountains through impressive water gaps. The Huallaga and the Urubamba are navigable at high water for shallow-draught boats and canoes within the mountain region; but the Marañón is not navigable above the *Pongo de Manseriche*, the gap through which it emerges from the Andes, for in the last hundred miles before it reaches the plains it drops over many rapids from about 1,500 feet to only about 500 feet above sea level.

Settlements of the Eastern Border Valleys

The Central District. So difficult has been the penetration of these Eastern Border Valleys that settlements have been established in only three districts. The most important is the central district, connected with the highland towns of Cerro de Pasco, Oroya, and Jauja. Settlers have also gone into this eastern country from Cuzco in the south, and from Cajamarca in the north.

The settlements of the central district illustrate the difficulties of transportation, and the results of the establishment of pioneer colonies in places not easily accessible to markets. Of the three chief colonies in this central district, two have now been reached by motor road from the highlands, but the third is still reached by rough trails passable only for mules. Huánuco was established, early in the colonial period, in a small valley basin along the Río Huallaga, about 6,400 feet above sea level; its settlers were enthusiastic about the delightfully mild climate and the productivity of the soils, but the colony languished because of the enormous cost of transportation. Tarma, in the Tarma Basin along the river of the same name, was another colonial settlement which could profitably transport to market only products of high value per unit of weight. In recent years, however, both these places have been made accessible by motor roads: Huánuco can now be reached in less than twenty hours of travel from Lima, by way of the railroad to Cerro de

Pasco and thence by automobile; Tarma can be reached by way of Oroya in even less time.

Motor roads, nevertheless, do not entirely overcome the effects of isolation. The small groups of white or mestizo landowners, who make up the aristocracy of the little towns, are able to make a living only under a system in which land and labor costs are reduced practically to nothing. The workers are Indian tenants recruited in the highlands, for in these eastern valleys there were no dense native populations already on the land. Each hacienda is essentially a self-sufficient unit, producing enough materials for the necessities of food, clothing, and shelter; the exports are exclusively for the benefit of the owner. The only products valuable enough to stand the high costs of shipment are sugar (converted into sugar brandy), coffee, cotton, and, especially, coca. The Incas used to plant coca in the more accessible eastern valleys. For many centuries the highland Indians of Peru and Bolivia have been addicted to the chewing of coca leaves, in which there is a small quantity of cocaine. Such products as these can stand the high costs of shipment to market over steep slopes and poor roads or trails. The cheaper connection with markets afforded by motor trucks which can now operate over the new roads has not changed the forms of land use, but has only increased the prosperity of the landowners.

The third chief colony in the central district still remains in isolation. This is the Pozuzo Colony in the valley of the Río Pachitea. In 1860 one hundred and fifty families were brought from Bavaria, with the assistance of the Peruvian government, to begin the work of colonizing this eastern domain. Each settler was given a small farm, and the colonists did their own work instead of depending on Indian tenants. Visitors to the Pozuzo Colony bring back enthusiastic reports of the neatness of the European-style homes, the attractiveness of the people, and the efficiency of their methods of farming. Yet the colony has not prospered. Unlike the European group in Antioquia in Colombia, the Pozuzo Colony has not grown in population and, consequently, has not expanded. The group, which today numbers around six hundred, has barely been able to maintain itself. Unable to adopt the traditional Peruvian system of labor exploitation, able to reach a market with barely enough goods to pay for imports of such essentials as matches, salt, and kerosene, not to mention the many manufactured items that Europeans demand, the Pozuzo Colony has had to remain largely self-sufficient. Self-sufficiency, even in a paradise, is not so attractive as some people who have never seen such a system in operation may think.

POPAYAN
COLOMBIA
PASTO
QUITO
ECUADOR
GUAYAQUIL
RÍO NAPO
RÍO CAQUETÁ
RÍO PUTUMAYO
RÍO PASTAZA
RÍO MORONA
DISPUTED
TERRITORY
IQUITOS
RÍO JAVARY
BRAZIL
OCEAN
PIURA
MOYOBAMBA
RÍO UCAYALI
RÍO JURUÁ
CHICLAYO
CAJAMARCA
RÍO MARAÑÓN
RÍO HUALLAGA
TRUJILLO
RÍO SANTA
HUARÁS
HUÁNUCO
CERRO DE PASCO
R. PERENÉ
TARMA
PACIFIC
CALLAO
LIMA
OROYA
HUANCAYO
RÍO APURÍMAC
URUBAMBA
RÍO MADRE DE DIOS
AYACUCHO
CUZCO
PISCO
ICA
LAKE TITICACA
BOLIVIA
PERU
LOCATION MAP
UPPER LIMIT OF LAUNCH NAVIGATION
AREQUIPA
MOQUEGUA
MOLLENDO
ILO
TACNA
ARICA
CHILE
0 SCALE 300
MILES
80°
75°
70°
0°
5°
10°
15°

Map 32

The Southern and Northern Districts. The settlements of the Eastern Border Valleys in southern Peru are almost entirely restricted to the lower Urubamba. The upper part of the Urubamba Valley ends abruptly a short distance northwest of Cuzco at the beginning of the Gorge of Torontoy. In the next twenty miles the river drops 3,000 feet, from over 11,000 to about 8,000 feet. Then, at elevations between 1,000 and 8,000 feet, a series of small basins along the lower river are occupied by settlers. A railroad was built from Cuzco toward the isolated settlements below the Gorge of Torontoy; but of the proposed 112 miles of line between Cuzco and Santa Ana, only 50 were completed before the collapse of rubber production stopped all such costly projects. Cacao, coca, sugar brandy, and other similar products are carried up to the highlands, but there is little profit left for the planters after the transportation costs are paid.

In the north the settlements center on the old colonial town of Moyobamba, which is connected by road with Cajamarca. In the steeply sloping valleys of this district, a variety of products can be grown, ranging from wheat and maize above, to cacao, coffee, cotton, and tobacco in the middle sections of the valleys, and to rice and sugar cane in the lower valleys. But here again isolation has hindered the development of the agricultural possibilities. During the period of the rubber boom in the Amazon, between 1880 and 1910, Moyobamba decreased in population from 12,000 to 5,000. Today some 40 per cent of the houses of the town are still unoccupied. The district is barely able to feed itself: a trickle of tobacco, coffee, cacao, and alcohol joins the cotton raised farther downstream to enter the markets of Iquitos east of the mountains, where river boats and even ocean-going steamers come from time to time to pick up small cargoes.

Iquitos, itself, is the chief commercial center of the montaña of eastern Peru (Map 32). Founded in 1863 by the Peruvians, it assumed considerable importance during the rubber period; but in common with most of the other towns of the Amazon it has since declined. The products which come to its warehouses include small amounts of many different commodities gathered from scattered sources over the vast extent of territory included in eastern Peru and Ecuador. Yet the total of such products is too small to bring much activity to this remote spot in the interior of the continent. Although small ocean steamers can come up the Amazon 2,300 miles from the Atlantic to Iquitos, activity along this superlative waterway has been slight since the end of the rubber days.

Routes across the Mountains

The forested eastern slopes of the Andes in Peru present the most serious barrier to trans-Andean communications. The most important connection between Lima and Iquitos passes through the central district of settlement in the Eastern Border Valleys. From Lima the first part of the trip is made on the railroad to Oroya. From Oroya an automobile stage carries passengers to La Merced, a short distance downstream from Tarma. From La Merced it is necessary to travel by muleback over the famous *Pichis Trail* to Puerto Jessup on the Río Pichis, and to go thence by canoe to Puerto Bermudez. From this little river port on the Río Pachitea, launches follow the winding courses of the Pachitea, the Ucayali, and finally the Marañón. It takes about a month, if all goes well, to reach Iquitos from Lima by this route. The river journey between Puerto Bermudez and Iquitos takes from fifteen to seventeen days going downstream, and from nineteen to twenty-one days for the upstream trip. In country such as eastern Peru, the airplane for the first time makes travel easy, although it does not reduce the costs of transportation for most commodities. Airplanes now fly between Iquitos and a place near La Merced in two days.

Another trans-Andean route crosses the mountains by way of Cajamarca and Moyobamba. An automobile road starts at Pacasmayo on the Pacific coast and extends to Cajamarca. East of Cajamarca travel is by muleback. The trail passes through the northern district of settlement around Moyobamba and descends to the river port of Yurimaguas on the Río Huallaga. From this place steam launches can make the downstream trip to Iquitos in three days.

Several routes cross the mountains south of Cuzco, but not by way of the settlements in the lower Urubamba Valley. Trails start eastward from various places along the railroad between Cuzco and Sicuani. Because the Río Madre de Dios is interrupted by falls and rapids, and, farther downstream, the Río Madeira is broken by the Madeira Falls, the products of this part of the Peruvian Montaña have sought an outlet over the mountains instead of by way of the Amazon. Indian porters carry their burdens over steep trails to collecting points along the railroad. In recent years a gold mine of some importance has been established on the eastern slopes connected by mule trail with the railroad (Map 29). From this southeastern part of the country, shipments, which amount to very little in bulk, eventually find their way out to the port of Mollendo on the Pacific.

THE WEST COAST

The third of the great natural divisions of Peru is the West Coast. Here the political and economic heart of the country has become established in a setting of strong individuality. To be sure, between 20° and 30° of latitude on the west coasts of all the continents there is a combination of cold ocean water and dry land; but in no other continent does this desert condition extend so far toward the equator as in South America along the coast of Peru.

One comes upon this remarkable region with dramatic suddenness. Proceeding southward from Panamá through the warm waters off Colombia the boat has scarcely reached the equator before the balmy softness of tropical air is replaced by a chill reminiscent of the coast of southwestern Spain or of southern California. On the land the first signs of increasing aridity are noted on the coast of Ecuador, only about a degree south of the equator. The transition from tropical rain forest to desert is unusually rapid: in about four degrees of latitude one passes through scrub forest, savanna, scattered xerophytic shrub, to barren desert. In Peru, between Tumbes (Map 21) and Chiclayo (Map 24), where the surface is not covered with live dunes, there is a scattering of desert plants, but south of Chiclayo most of the land is bare (Maps 26 and 27).

Surface Features

Along the coast of Peru the areas of flat land are small and disconnected (Maps 24 and 25). In the north, although the western base of the Andes continues in its southeast-northwest direction, the coast bends in a broad arc toward the west, leaving, between Piura and Chiclayo, a wide belt of lowland. The greater part of this area, however, is covered with moving sand dunes. Between Chiclayo and a point just north of the mouth of the Río Santa the coast line and the base of the mountains come gradually together, and the coastal lowland is pinched out. From the Río Santa as far as Pativilca the precipitous rocky slopes of the Andes rise directly from the Pacific. Along this stretch of coast there are protected harbors for small boats in the tiny rock-encircled bays, such as the one on which Chimbote is located. South of Pativilca as far as Pisco the alluvial fans built by the rivers are so large that they have almost grown together along the coast, producing a narrow lowland of irregular width, interrupted here and there by rocky spurs from the Andes. From Pisco southward the coast is bordered by a range of low mountains which, back of Mollendo, reaches an altitude of 3,000 feet. Behind the Coastal Range, separating

it from the base of the Andes, is a bleak, rocky surface, deeply and intricately dissected by streams which mostly remain dry throughout the year—a surface which begins only a little below the crest of the Coastal Range and rises to over 5,000 feet at the base of the Andes. The places where man can establish agricultural settlements on this coast are limited not only by aridity but also by the ruggedness of the surface.

Climate and Fauna

The basic cause of both the dryness and the coolness which are characteristics of the West Coast is the presence of cold water offshore, the so-called Peru Current.[5] Along all the continental west coasts with the exception of that of Australia there is an equatorward-moving current of cold water, accompanied along the immediate shore by upwelling water from below with especially low temperature. But in no other part of the world are these phenomena so strongly developed as off the West Coast of Peru and Northern Chile. This cold-water current is made up of two distinct parts with contrasting characteristics. The *Peru Oceanic Current* is found at an irregular distance offshore: it is cold, but not so cold as the water nearer the land; it is poor in marine organisms, and is of a deep indigo color. This oceanic current, under the influence of the earth's rotation, tends to swing to the west away from the land. The other division of the coastal waters is the *Peru Coastal Current* which is some fifty to a hundred miles in width and is fed by the upwelling water. It moves northward faster than the oceanic current; its water is colder, and is remarkably uniform in temperature all the way from Chile to northern Peru—having an average temperature between 58° and 64° along the shore. This current is remarkably rich in marine organisms, and is of a greenish color.

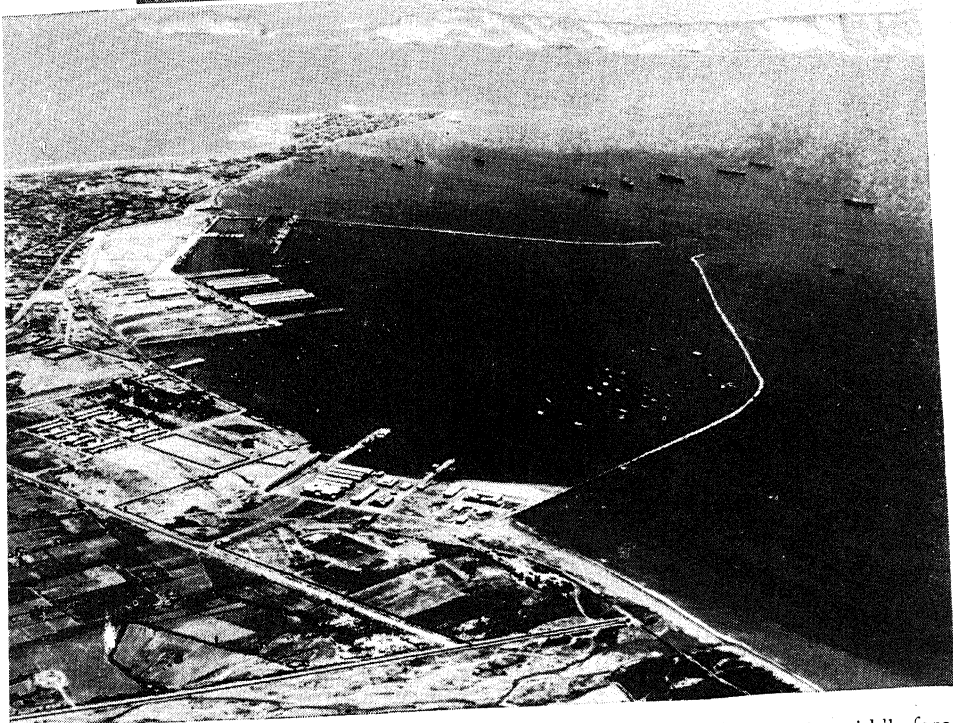
As a result of the cold water the air temperatures all the way from Northern Chile almost to the equator are lower than the averages for each latitude. For example, the average annual temperature at Lima is 66.7°, which may be compared with the average of 76.6° at Salvador in Baía on the east coast of Brazil at the same latitude.

Most of the time this coast receives very little rain. The average precipitation at Lima is only 1.9 inches per year, but for many years at a time *no* rain falls. In the north, at Piura (about 6° S.) there is a little

[5] This current was formerly called the Humboldt Current by some writers because the great German geographer, Alexander von Humboldt, was the first to measure its temperature. Recently the leading authorities have agreed to use the name Peru Current (70, 71, and 72).

rain each year, but at the latitude of Chiclayo (about 7° S.) one has to climb the slopes of the Andes to an elevation of more than 3,000 feet to reach the zone of annual rains. At Lima (about 12° S.) this zone is over 5,000 feet up, and south of Pisco (about 14° S.) it is over 7,000 feet above the sea. The coastal zone below receives rain only at intervals of many years, although it is frequently foggy and cloudy.

The reasons for this peculiarity of the climate are easy to understand. The south and southwest winds which prevail along the Peruvian coast[6] cross water which is progressively cooler and cooler toward the land. Crossing cold water, where evaporation is very much less than over warm water, the air can pick up only a relatively small amount of moisture. Nevertheless, because the temperature of the air is continuously lowered, it may be brought to the point of condensation and sea fogs may be formed along certain parts of the coast. Whether or not these fogs appear, the air on reaching the land is forced to rise against the front of the Coastal Range or the Andes, and the rise causes adiabatic cooling of the already cool air. Because of the low temperature and the low humidity, however, this rise of air along the mountain front is sluggish. During the winter of the southern hemisphere when the winds are strongest, the rise is sufficient to lower the temperature to the condensation point and to produce a heavy sheet of stratus clouds. From the bend of the continent at Arica (just south of the area shown on Map 25) northward to about 11° south of the equator this coastal cloud is thick and persistent from June to October; north of that latitude the cloud is thinner and more irregular. In spite of gray skies more than a few drops of rain seldom fall, and the land below remains parched and barren. Where, on the other hand, the cloud rests against the slopes of the Coastal Range

[6] According to the classical descriptions of the world's wind systems this part of the Southern Hemisphere should lie in the zone of the southeast trades. On a rotating earth, however, all moving bodies tend to advance along curving lines, not straight lines: in the Northern Hemisphere deflection is to the right, in the Southern Hemisphere to the left. A more realistic generalization of the world's wind systems, therefore, recognizes the existence of great whirls of air. These are centered around the permanent areas of high pressure located over the eastern parts of the ocean basins about latitude 30° north and south. Clockwise whirls in the Northern Hemisphere and counterclockwise whirls in the Southern Hemisphere produce, in the low latitudes, generally easterly winds; in the middle latitudes, westerly winds; but along the continental west coasts the winds are more nearly from a poleward direction, and along the east coasts from an equatorward direction. As a matter of fact the winds on the coast of Brazil south of latitude 8° S. are predominantly from the northeast, and those on the West Coast are from the south and southwest between Middle Chile and the equator. These facts are more fully presented in P. E. James, *An Outline of Geography*, Boston, 1935, pp. 134–136, and sections of the Appendix; and in V. C. Finch and G. T. Trewartha, *Elements of Geography*, New York, 1936, pp. 84–99.

The upper picture shows the center of Lima, capital of Peru. In the middle foreground are the plaza and the great cathedral. Francisco Pizarro laid the cornerstone of this cathedral over four hundred years ago; in one of its chapels the mummified remains of the conqueror of Peru are still on view. The lower picture shows the port of Callao. In the distance is the Island of San Lorenzo, which, together with the promontory, gives Callao some protection from the prevailing southwest winds. The new breakwater permits steamers to tie up at the docks.

The upper picture shows a street in "down-town" Lima. In spite of such modern trimmings as traffic lights, the problem of operating automobiles on narrow sixteenth-century streets is not easily solved. North American visitors soon learn that a *chopp* is not something to eat. Below is a scene on one of the coastal oases. Irrigated cotton and trees on the wet lands are in marked contrast to the naked slopes of the mountains, which are seldom moistened except

or the lower foothills of the Andes, the heavy mist, known as *garúa*, supplies a soaking moisture to the land. The dense growth of quick-flowering plants and grasses which appears with the garúa is described in Peru as *loma* (Maps 26 and 27). In the neighborhood of Lima the zone of the lomas begins about 2,600 feet above sea level and extends to approximately 4,600 feet; toward the south the lower limit descends somewhat and the upper limit rises. The lomas supply pasturage for animals during the cloudy season, from June to October; at just the opposite season from the rainy period in the highlands, which comes in the summer, from October to April.

The climatic peculiarities of the coastal region are matched by other elements of strong individuality. In contrast both to the barren waters of the Peru Oceanic Current and to the barren surface of the land is the water of the Peru Coastal Current. Here there is an exceptional richness of microscopic marine organisms or diatoms. The chemical composition of this water together with the protection from too much sunlight under the coastal cloud provides the necessary environment for a rich organic life. These microscopic organisms, in turn, provide the necessary food for a most amazing number of fish. Immense schools of small fish are preyed upon from below by larger fish, and from above by a bird population that is one of the most extraordinary spectacles the world has to offer. There are long lines of pelicans flying close to the water; there are clouds of cormorants that hover above the schools of fish; and there are places where the water is broken into spray by flights of gannets diving for their food. The excrement of these birds, deposited in part on the islands and promontories where they nest, and preserved in the arid climate, forms one of Peru's most notable resources—*guano*, a fertilizer containing from 14 to 17 per cent of nitrogen.

The bird colonies on the islands and promontories of the coast occur in almost unbelievable numbers. A study of one of the Chincha Islands, off Pisco, led to some interesting estimates (72). On one relatively small area there were some 5,600,000 birds. To feed such a colony would require not less than a thousand tons of fish each day. A million birds provide about 10,000 tons of guano per year. Here, indeed, is one of the most remarkable examples of an intricately balanced complex of the organic and the inorganic: at the base, cold water exceptionally rich in microscopic organisms; supported by these organisms, a vast number of birds, whose guano is preserved in the rainless climate, in turn produced by the cold water; and on the land men enabled to raise irrigated crops year after year on the same soil with the aid of this fertilizer.

But every now and then this whole harmony of interrelated parts is utterly destroyed. Every year in the north, as far south as Chimbote, winds from across the equator bring southward a back eddy of warm water, which spreads over the surface of the cold water. Because this back eddy appears about Christmas time or during January, February, and March, it is called *El Niño*, the Christ Child. In normal years it forms only a thin surface covering over the cold water and is soon dissipated. But at somewhat irregular intervals, for reasons not yet fully understood, the north wind is stronger, the invasion of El Niño is more vigorous, and warm water covers the cold water all the way to northern Chile. On one of these occasions, in 1925, the temperature of the water in Callao harbor, which is normally in the low 60's, rose to 80°.

The disasters which accompany this change surpass the traditional seven plagues of Egypt! First, the warm water greatly increases the humidity in the air. Then the warm, moist air bounces when it strikes the land, instead of rising sluggishly; its vigorous rise results in the formation of towering cumulus clouds from which come deluges of rain. At Trujillo, between 1918 and 1925, the total rainfall was only 1.4 inches; but during the month of March, 1925, a total of 15.5 inches fell, and, on the three days from the 7th to the 9th the rainfall was 8.9 inches. But this is not all. The fish depart from the coast, following the colder water with its supply of food; the birds, whose characteristically high rate of metabolism requires that they feed at frequent intervals, starve to death by the millions. Floods of water destroy irrigation systems and cover the fields with coarse gravel; the houses, built for a dry climate, crumble and collapse; roads and bridges are washed out; insects of great variety fill the air, bringing discomfort and disease to the harassed inhabitants. Only slowly is the balance of nature restored; as the next long period of aridity begins men start the work of rebuilding.

Disasters of this sort are too widely spaced to demand that the Peruvians adopt costly protective measures. Along the northern part of the coast the greatest amount of destruction occurs; in the middle section the heavy rains do less damage; along the coast of northern Chile these years bring only light showers. Records indicate that such events took place even during the Inca period; during the last half century disasters occurred in 1878, 1884, 1891, 1918, 1925, 1932, and 1939.

Agriculture

Such is the physical character of this unusual region. Life in it must be adapted not to the rare floods, but to the prevailing aridity—to the

decades which may pass with no more than a few drops of rain. Life, in such a land, is given by water. But of the fifty-two streams which descend from the western slopes of the Andes to the coastal region of Peru, only ten have sufficient volume to continue across the desert and discharge throughout the year into the ocean. These are the streams which rise far back in the mountains among the snow fields of the highest cordilleras. All the rivers lose volume downstream, and those which rise lowei down among the lesser summits dry up completely during the dry part of the year. The first trickle of moisture from the highlands appears in the river channels in October or November. From December to March the streams are in flood, but by June or July the amount of water begins to decrease rapidly. From August to October most of the channels are dry.

The Incas practiced agriculture in this region before the arrival of the Spaniards. Their irrigation works and the terraces on the lower slopes, with which they increased the arable area, were carefully built and maintained. The ruins of their cities in the vicinity of Lima and Trujillo are still visible. The first result of the Spanish conquest, however, was the shift of labor from the production of food to the search for gold: the irrigation systems and the terraces were neglected and eventually abandoned.

During the whole colonial period, and, in fact, during most of the nineteenth century, agriculture in Peru was solely for local subsistence and for the support of the mining population. About 1884, however, the white and mestizo landowners of the coastal region began to undertake the production of commercial crops. First, sugar cane was the most important; but since 1924 cotton has been more important than sugar. These two crops now make up 85 per cent of the agricultural exports of Peru, and they are grown almost exclusively on the irrigated lands of the coastal region. In 1936, cotton occupied 39 per cent of the irrigated area, and sugar cane occupied 13 per cent. Rice occupied 11 per cent of the oasis lands, and a variety of other food and feed crops took 37 per cent in scattered small units.

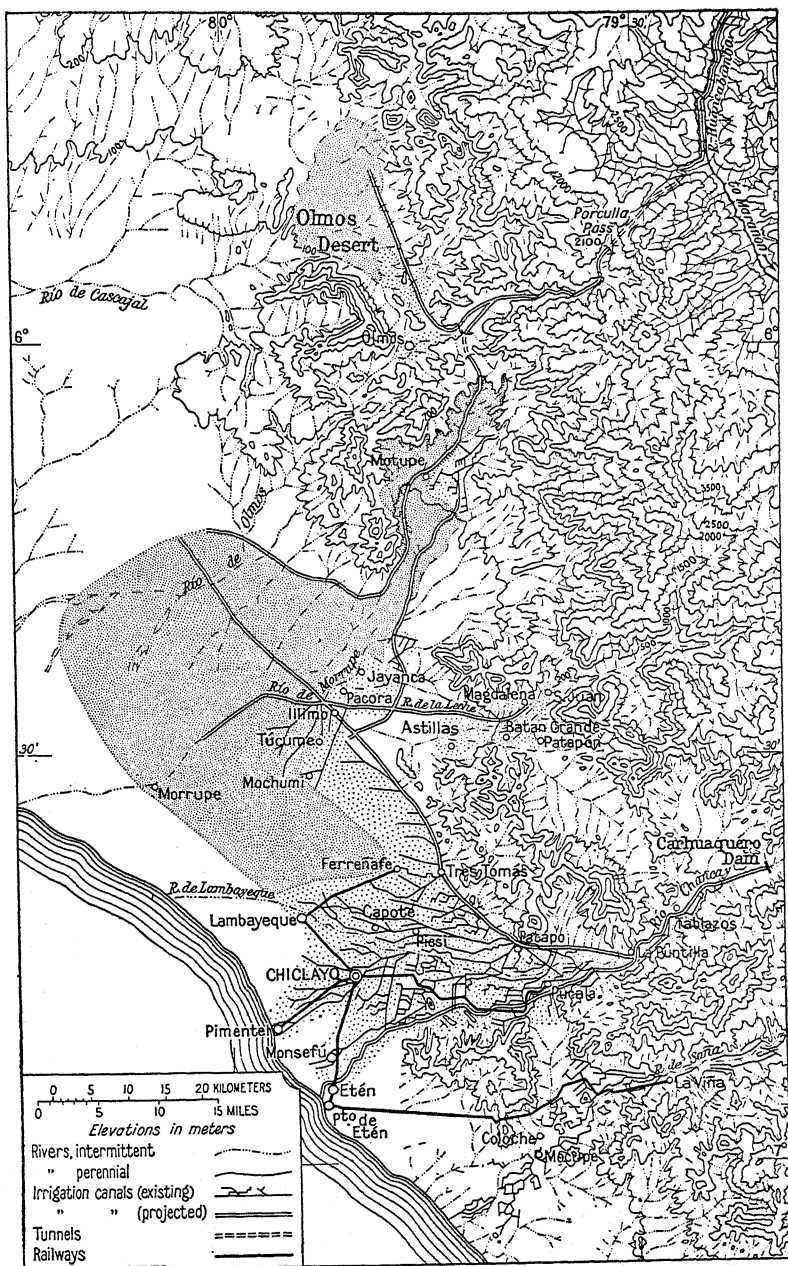
At present there are a little more than a million acres of cultivated land, all irrigated, in the coastal region. During the period from 1932 to 1937 the Peruvian government supplied water to 100,000 acres of new land by building new irrigation works in the mountains. In one district the headwaters of some of the Amazon tributaries have been diverted in borings through the continental divide and have been added to the coastal streams. It is estimated that it is technically possible to increase the present irrigated area by some 30 or 40 per cent, but only at a high cost.

The Oases

Northern Group. Along the Peruvian coast there are about forty distinct oases (Maps 28 and 29). Many of them are not visible from the ocean, for they are restricted to the section close to the mountain front. Most of the oasis towns are situated back from the shore; but each important town is connected by rail to an open roadstead where ships lie at anchor offshore and use small lighters for discharging and loading their cargoes. The ports in many instances are no more than a group of low buildings near a landing place surrounded by absolutely barren desert. A few of the oases, however, are supplied with enough water to support a strip of verdure all the way to the ocean.

Each of Peru's forty oases possesses a marked individuality. In some, the streams emerge from the mountains and cross the desert lowlands in channels deeply cut below the surface, so that water for irrigation must be taken out in irrigation ditches far upvalley within the mountains. This is the situation, for instance, in the oasis of Trujillo. In the oasis of Chiclayo, on the other hand, the river emerges at the apex of an alluvial fan and splits into several channels as it descends—channels which have now been replaced by a diverging system of ditches.

Except for a few small irrigated valleys around Tumbes, near the Ecuadorean border (Maps 22 and 23), the northernmost of the Peruvian oases is that of Piura, with its port, Paita (Maps 24, 28, and 30). Two rivers supply water in this area. The northern of the two rivers is far more dependable in its flow than the southern one, and along its banks, supplied with water by irrigation ditches, there are fields of Egyptian long-staple cotton. The southern of the two rivers is used at a number of places upstream for the irrigation of subsistence food crops, but near Piura its waters are used also for the irrigation of cotton. This cotton, however, is not Egyptian, but the hardier Peruvian variety, which also has a long fiber. The sand dunes, moving northward from the desert south of Piura, choke the outlet of the Río Piura so that it ponds in the sandy depressions, or seeps below the surface where its waters are available for the roots of plants. As a result, the cotton is not planted in regularly outlined fields reached by an organized system of irrigation. Instead, it is planted in scattered areas wherever the ground water is found to be sufficiently abundant. In good years the outline of the cultivated area expands, but in years when the moisture is less plentiful, the cotton area shrinks to only a few fields close to the river.

A wide zone of shifting sands separates the Piura oasis from the next

MAP 33. THE CHICLAYO DISTRICT

(Courtesy of the *Geographical Review*, published by the American Geographical Society of New York.)

group to the south, around Chiclayo. Here three distinct areas make up the Chiclayo district, served by the little ports of Pimentel, Eten, and Pacasmayo. In the oases of the Chiclayo district the higher sections of the alluvial fans, where the water can be taken as it emerges from the mountains, are occupied by a few large sugar estates. If there is any surplus water, the small property owners farther downstream can use it. When water is available beyond the needs of the sugar planters, the small farmers use it to irrigate rice. In fact, the three oases around Chiclayo, together with those along the Río Piura, produce 75 per cent of the Peruvian rice crop. One of the largest recent extensions of the irrigated area of the West Coast is on the northern border of the Chiclayo district, where a more plentiful supply of water, brought from the Amazon headwaters, has recently made possible an expansion of the rice area (Map 33).

South of the Chiclayo oases lies the Trujillo district, composed of two distinct areas of cultivation north and south of the city of Trujillo. The Trujillo district is occupied predominantly by large estates devoted to the cultivation of sugar cane. In 1936 there were some sixty-nine properties, grouped around twenty-five mills where the cane is crushed and sugar produced. The tendency in recent years has been toward a decrease in the number of estates through the combination of smaller ones into larger units. The two oases of the Trujillo district produce 56 per cent of the Peruvian sugar; combined with the estates of the Chiclayo district, this part of the West Coast raises 88 per cent of the sugar crop. The chief port of the Trujillo district is Salaverry.

From an agricultural point of view the oases of northern Peru are superior to those situated farther south. Not only is the water supply more dependable, but the north also enjoys more sunshine than that section of the coast which regularly comes under the pall of the coastal cloud. It must be noted, however, that the destruction which follows the occasional southward spread of the warm ocean current is also concentrated in these northern oases.

South of Trujillo the Andes reach the shore. The rivers, like the Río Santa, although they bring an abundance of water all the way to the ocean, are narrowly bordered by precipitous rocky slopes. The irrigable area in this section, therefore, is restricted more by the contour of the land surface than by the supply of moisture. A succession of little ports—Chimbote, Samanco, Casma, Huarmey—serve the valleys immediately back of them. Small amounts of sugar cane are raised, but most of the irrigated land is devoted to subsistence crops.

Middle Group. The middle group of oases includes those between Pativilca and Ica. Both sugar cane and cotton are grown on this part of the coast, but because of the smaller amount of sunshine under the thicker coastal cloud, the yield of sugar is much less than in Trujillo and Chiclayo. Cotton, therefore, is more important than cane. The cotton is the Peruvian variety, raised both on large estates and small farms. So great is the demand for field hands during the picking season, especially in the oasis around Lima, that a regular migration of highland Indians from the basins of Jauja and Huancayo takes place each year. The cotton of this middle area is harvested from April to September, whereas the cotton in Piura, to the north, is harvested from July to November.

In addition to cotton and sugar a number of other crops are produced in the oases of this group. Around Lima a large proportion of the irrigated area is devoted to truck crops to supply the cities of Lima and Callao. The southernmost oases of the middle group specialize in the cultivation of vineyards, for which Ica is especially well known. The port of Pisco gives its name to a celebrated brandy, sold along the whole west coast of the Americas from Chile to California.

The middle group of oases is also characterized by the development of a regular seasonal movement of herders with cattle and mules up and down the mountain slopes—a form of transhumance. In summer the animals are driven to the highland pastures, wet at that time; they return to the coastal region between June and October to make use of the lomas during that season of frequent *garúas*. Such a seasonal movement is not developed in the north because there are no lomas; nor is it developed in the south, for there the highland pastures are too remote from the oases of the coast.

Southern Group. South of Ica most of the oases are used only for the production of subsistence foods. The area which might be devoted to irrigation is limited not only by the increasing aridity of the highlands as one proceeds southward, but also by the rugged nature of the coastal region itself. Most of the inhabitants of these oases are Indians, and the density of population within the oases is much less than where there is commercial production (Maps 25, 29, and 31). Ribbons of cultivated land follow the narrow valley bottoms from the mountains to the sea, but in most years it is only the upper parts of these oases that can actually be irrigated. According to the system in Peru the property owners upstream have the first right to the water, and in dry years—which are more frequent than wet years—there may not be sufficient volume to supply the properties downstream.

Two of the oases south of Ica, however, are of importance for their commercial production. The largest of these is the oasis of Arequipa, located in a valley just within the mountains at the base of the volcano El Misti. The abundant water in this district is used to support an intensive cultivation of crops for food and feed, all of which are consumed locally. Animals fattened on alfalfa pastures are exported in small numbers. Arequipa is of chief importance as a wool market, serving the whole southern part of the highland region. A railroad extends inland to Cuzco and also to Puno on the shores of Lake Titicaca. By way of this lake a considerable volume of traffic from northern Bolivia passes through Arequipa; by way of the railroad from Cuzco a small amount of commerce reaches Arequipa from the Peruvian Montaña and the Eastern Border Valleys of the south. Arequipa is a city of 46,000 inhabitants, the third largest urban center of Peru (after Lima and Callao).

The port which has served Arequipa since colonial days is Mollendo. This place, however, has long been recognized as one of the spots along this harborless coast where landing operations are most difficult. Mollendo faces toward the south and is entirely open to the unobstructed sweep of waves driven by the prevailing winds. In recent years the Peruvian government has undertaken the work of building an entirely new port about seven miles northwest of Mollendo. At the new location a small promontory gives some protection from the south, and the natural conditions of the site are being improved by the construction of two breakwaters. Inside the harbor thus created ships tie up at a dock which has been equipped with the newest loading devices. The railroad from Arequipa has been extended along the coast from Mollendo. This new port, which is known as Matarani, was completed early in 1941, and, it is believed, will soon entirely replace the old city of Mollendo as the outlet for Arequipa.

The other commercial oasis of the southern group lies south of the area shown on Maps 25, 29, and 31. The farmers in the valley of Moquegua, served by the port of Ilo, specialize in vineyards and plantations of olives. Tacna, the southernmost of the Peruvian oases, is of prominence only for historical reasons, for it, like most of the other spots of settlement in the south, grows crops primarily for the local food supply.

The Peruvian Oil Fields

Only a few clusters of people in the coastal region have been established as a result of activities other than agriculture. The guano diggers, now

carefully controlled by the government of Peru, are permitted to produce from any one island only temporarily and then are forced to leave that place undisturbed to permit the birds to re-establish themselves. No permanent concentrations of workers, therefore, result from the guano industry.

The oil fields of northern Peru, however, do support small clusters of people in the territory between Paita and Tumbes (Maps 22 and 23). In this district there are three chief oil fields. The northernmost field, Zorritos, is not far from Tumbes. Oil production from this area dates back to the period between 1872 and 1898, during which twenty-nine wells were drilled. Most of the oil now comes from Lobitos and from Negritos —both fields located near the oil port of Talara. Negritos is by far the largest of the Peruvian oil fields, producing in recent years more than 75 per cent of the Peruvian total. The Zorritos field is controlled by a Peruvian oil company, but the Lobitos and Negritos wells are owned by a British company.

Lima and Callao

The political, social, and economic focus of all these separate clusters of people and their diverse activities is on Lima and its port, Callao. During the colonial period most of western South America came under the dominance of Lima, and the influence of this center was felt even as far as the mouth of the Plata in Argentina. Now Lima has been shorn of its control over this wide hinterland. Lima is a city of ancient traditions; but as the center of modern Peru it is becoming industrialized and is growing rapidly in population.

In 1535 Pizarro selected this site for the foundation of his capital because it combined two special advantages which were important to the Spaniards. In the first place they found here one of the larger irrigable areas of the coastal region, for the Río Rimac brings down an abundant supply of water to an alluvial plain of broad dimensions. The other advantage was the presence of an offshore island, and a long gravelly promontory which points toward the island from the mainland. Island and promontory together provided a protection from the waves brought in from the open Pacific by the prevailing southwest winds. In Callao harbor it was possible to anchor in calm water. To be sure they could have found other large irrigable areas along the coast, and other places where small harbors offered protection to the small boats of the sixteenth century—for example, in the bay of Chimbote. It was the com-

bination of a large irrigable area and near by protected anchorage which was unique: for the first time this combination became significant when the seafaring Spaniards wrested the control of the country from the landlocked Indians.

The city of Lima, eight miles inland from Callao, was laid out in the characteristic Spanish manner on a strictly rectangular pattern around a central plaza. In most of the Spanish colonial cities the dimensions of the blocks, the width of the streets, and even the arrangement of the government buildings and the church around the plaza were all standardized. Lima incorporated all these features which characterize Spanish cities from California to the Strait of Magellan—although this city was laid out before the plan had been prescribed by law.

Lima today performs a variety of functions. As the capital it has attracted and given support to an army of government workers, representative of all the different parts of Peru. As chief commercial center of Peru, it receives most of the country's imports, and most of the business enterprises of the country have offices there. As center of art and education Lima has drawn to itself many artists, literary people, and teachers; the University of San Marcos, the oldest university in South America, attracts students not only from Peru but also from beyond its borders. Because Lima is the capital of a Latin country it is also a social center, and in it are concentrated many of the aristocratic landowning families. Their high standard of living is possible for only a very small proportion of the whole population in a land where poverty is so widespread; this small group, through the exploitation of large areas of the Peruvian soil, has created in Lima the flower of the older Spanish civilization.

Disturbing changes began to appear in the urban scene during the First World War. New political ideologies taken up by the relatively small but powerful student population are resulting in a more realistic study of the "Indian problem." But of even more profound significance is the new industrialization, and the changing attitudes engendered by it. In addition to the big mineral smelters in the Andes, and the petroleum and sugar refineries of the northern part of the coastal region, manufacturing industries have now made their appearance in Lima and Arequipa. Factories produce foodstuffs, cotton and woolen textiles, cigarettes, matches, beverages, leather, soap, and various items of clothing. The Peruvians stand third today in South America in the per capita use of energy—exceeded only by the Chileans and the Argentines. In the midst of Lima's historic buildings and narrow streets new styles of

architecture are bringing changes which tend to make this place look more and more like all other modern cities. Industrial slums, and all the social problems which accompany them, have been added to the rural poverty of the older Peru. In modern Lima are to be found the same problems and the same new attitudes toward life which characterize the larger urban centers of all the Occidental world. Modern Lima exhibits the latest ideas imported from other continents, now strangely in contrast to the traditional ideas of the country, just as colonial Lima used to display, for the wondering eyes of the Indians, the strange ideas and materials brought to the new land from Spain.

PERU AS A POLITICAL UNIT

A profound, unsolved diversity, then, is an essential characteristic of Peru, just as it is of other South American countries. Most people who come in contact with this country and its people touch only one of its many facets. Peru is one thing for the traveler who knows only Lima and sees the rest of Peru from a boat; it is a little more to the tourist who takes the railroad to Cuzco and sees, even if he does not understand, the contrasted human types of this land. Peru is still another thing to the person interested in commercial production and in exports and imports, or to the engineer who must wrestle with mining, water-supply, or transportation problems. And Peru is something else again to the average Peruvian of Indian ancestry who sees all these activities going on, but who plays only a small part in them.

About half of the products which Peru sends to foreign markets are from the mining industries, and about half from the commercial agriculture of the coastal region. Petroleum in recent years has been first among the exports of the country, being used by boats, railroads, and industries not only in Peru but also in Bolivia and Chile. In 1938 Peru was the second country of Latin America in oil exports, accounting for 8 per cent of the total. Peru was also the second country in copper exports, with 13 per cent of the total. In addition lead, gold, silver, vanadium, bismuth, and other metals enter into the list of exports in fluctuating amounts.

Although the big mining companies have without doubt poured large sums of money into Peru for the construction of lines of transportation and for the construction and operation of smelters and refineries, and although these industries employ directly or indirectly a considerable number of Peruvians, the fact that most of the earnings are exported to

pay interest on borrowed capital cannot be disregarded. Furthermore, Peru suffers, as do most mining communities, from the inevitable ups and downs of prosperity which come from the double insecurity of uncertain ore bodies and uncertain markets.

Peru is one of the few countries of Latin America which produce coal. Its coal deposits, however, are small and difficult of access, and only fair in quality, having between 27 and 32 per cent of ash. The rise of the petroleum industry has greatly reduced the demand for and, consequently, the production of coal.

In contrast to the fluctuating commerce in mineral products, trade in the agricultural items, cotton and sugar, has been relatively stable. In the years just before the Second World War, to be sure, the widespread tampering with the free currents of international trade introduced unpredictable elements of instability into the world markets for long-staple cotton and for sugar. Of the cotton crop, which ranks with oil as one of Peru's leading exports, 85 per cent enters foreign markets. In 1938 Peru was the second Latin-American country in cotton exports, supplying 18 per cent of the total cotton exports of South and Middle America. The cotton is sent chiefly to the United Kingdom, and in smaller amounts to Germany, Japan, Belgium, and France. Sugar was the leading agricultural export until 1924, but since that date it has dropped far below cotton. Only 18 per cent of the crop is consumed in Peru. In sugar exports, however, Peru in 1938 stood third in Latin America with 5 per cent of the total.

The foregoing figures tell us about only one aspect of Peru, and to most Peruvians it is a minor aspect. The commercial products of the country require the services of, and bring financial gain to, only a small proportion of the inhabitants. It is estimated that approximately 85 per cent of the people are engaged in agriculture, and for probably about half of them agriculture means the growing of food or feed crops for local use. Furthermore, only 1.2 per cent of the area of Peru is used for crops. These figures reveal vividly the essential problem of the country: lack of sufficient arable area for the support of a predominantly agricultural people.

Even in terms of food supply, however, it is impossible to generalize about the country as a whole, and figures which submerge regional amounts in national totals are dangerously misleading. The items which form the basis of the food supply in different regions are not at all the same. In the coastal region, moreover, there is a difference between the demands of the well-to-do classes, most of whom live in the cities, and

the demands of the working classes. The former eat wheat and meat. The large urban centers of Lima and Callao are supplied with these things from near-by areas: the wheat from the Huancayo Basin; the meat from the herds of cattle that feed part of the year in the highlands and part of the year on the lomas of the coast. The urban laboring people, on the other hand, use rice as the basis of their diet.

Until recently the domestic production of rice was not sufficient to satisfy the Peruvian demand and a considerable amount of rice was imported annually from Oriental countries. The enlargement of the irrigated area in the Chiclayo oasis greatly increased the domestic production of rice, and in 1937 only 9 per cent of the supply was purchased outside the country. The cost of producing rice in the Orient, however, is less than in Peru, where expensive irrigation is required. Successful competition with Oriental rice is made possible by the tariff imposed by the Peruvian government. Thus we see that in Peru, as in many other countries, immediate social and economic problems seem more effectively attacked at the moment by a local increase of production and employment in spite of the fact, not always clearly understood, that the cost of living is thereby raised. National economic self-sufficiency is an expensive dream, whether it is dreamed in Germany, or in the United States, or in Peru.

The modern urban atmosphere which is permeating ancient Lima; the spirit of technical efficiency which has vitalized some of the large cotton and sugar plantations; the essentially foreign character which sets off the mining communities from the region in which they are embedded—these things are representative of only a part of Peru. There is also the Peru of the pure Indians and the near-Indians: communal, self-sufficient, primitive, superstitious, so closely adjusted to the land as to defy the forces of change, indifferent to prospects of material progress, heedless of the currents of political controversy which sometimes reach revolutionary violence. Sooner or later the problem of the Indian will have to be faced, and facing it will inevitably involve profound social readjustments such as are going on today in Mexico. Yet at the moment these two incompatible ways of living, that of the Indian and that of the European, seem no nearer to mutual adjustment than at any time during the four centuries they have been locked together in the same land.

6

REPÚBLICA DE BOLIVIA

Total area, 419,470 square miles

Total population, 3,457,000

Capital city, La Paz; population, 250,000

Trade per capita:

Imports: $ 7.43
Exports: $15.62

Unit of currency, boliviano ($.618, gold content value)

Major commercial products in order of value:

tin	gold
silver	antimony
lead	copper
wolfram	rubber
zinc	hides

Railroad mileage, 1,311

(The above statistics are for the year 1938.)

6

BOLIVIA

BOLIVIA is an inland state. Nor is this characteristic solely a matter of political boundaries. Before the War of the Pacific (1879–83) Bolivia's territory included the port of Antofagasta and a stretch of coast on either side of it (Map 40). Bolivia lost the coast to Chile not only because her armies were not so successful as those of Chile, but also because Chileans rather than Bolivians were carrying on the effective exploitation of the nitrate deposits. In recent years Bolivia has been engaged in another war, this time with Paraguay; one of the stated objectives of the Bolivians was the establishment of a port on the Río Paraguay. Yet a study of Bolivia suggests that even if Chile had not taken away the strip of coastal territory, and even if the Bolivians had been able to push the Paraguayans back to the river, the Bolivian state would have remained essentially an inland one. The small core of effective national territory which forms the center of Bolivia (Map 1) is separated from the coast by major physical barriers; and the character of the people and the arrangement of their settlements in the central area are such that the necessary force to overcome these physical barriers has never been generated.

The physical barriers which isolate the core of Bolivia from the Pacific Ocean are altitude and aridity. The clusters of Bolivian people are located mostly in the valleys and basins of the Eastern Cordillera (Maps 34 and 37). Separating these clusters of people from the West Coast, there are high, bleak, wind-swept plateaus, towering ranges of volcanic peaks with passes above 13,000 feet, a desert which is one of the driest

in the world, and an escarpment more than 2,000 feet in height which drops steeply to a harborless coast. In western and southern Bolivia the great dry belt of South America which extends from southern Ecuador almost to the Strait of Magellan crosses the Andes diagonally from northwest to southeast (Map 10). Between latitudes 20° and 30° S., within that zone which is dry on the western sides of all the continents, South America is so very deficient in moisture that the land is almost entirely barren of vegetation. Even in the high Western Cordillera of the Andes there is so little rain that few streams emerge from the mountains. Only one exotic river, the Río Loa, rises in the Andes and flows all the way across the desert of what is now Northern Chile to the Pacific Ocean. East of the Western Cordillera, over the whole southwestern part of the present Bolivian territory, the rainfall is so scanty and so uncertain that only a very few spots can be found where drinkable water is available.

The internal force by which a state might be enabled to expand across such physical barriers is lacking in Bolivia. Like Ecuador and Peru, this state is burdened by the problems arising from the presence of two incompatible racial and cultural groups, the Spaniards and the Indians. But in Bolivia the problems of cultural diversity are further complicated by the arrangement of the population in small and more or less isolated clusters and ribbons of settlement (Map 37). Lacking the biological vigor of the people of Antioquia, the Bolivians have remained mostly within the valleys and basins of the Eastern Andes, separated, even within the core of effective national territory, in small and therefore weak units. The various communities of inhabited Bolivia, many of them composed of pure Indians, have never succeeded in developing a closely knit sentiment of national unity even under the pressure of war. Meanwhile, the exceptionally rich minerals with which this country is endowed have provided the lure and the reward for speculative development and have led to the establishment of a shifting, unstable mining economy in the midst of a predominantly agricultural people.

THE BOLIVIAN PEOPLE

Bolivia, like Peru, Ecuador, and the southern part of Colombia, is occupied by a population which is more than half pure Indian. Much of Bolivia was included within the limits of the Inca Empire, and Quechua is still the common language (Map 4). Around Lake Titicaca, however, are the descendants of a people whose civilization was much older than that of the Incas, a people who speak the *Aymara* language. The ruins

of their former cities, which were conquered by the Inca armies, bear witness to their having attained a high degree of civilization. Today there is little difference in the way of living or the attitudes of the people who speak these two languages; but there is a great difference between the highland Indians on the one hand and the various groups of lowland Indians on the other.

For Bolivia as a whole the most reliable estimates indicate that the proportion of pure Indians is about 54 per cent. The mestizo group amounts to about 32 per cent. Europeans of pure descent are very few, but Europeans only slightly mixed with Indian blood are estimated at 13 per cent. The remaining 1 per cent is composed of Negroes and others.

The various clusters of people in Bolivia, however, are quite diverse in their racial composition. In the highland regions the clusters located at the higher altitudes have the largest proportion of Indians. Around the shores of Lake Titicaca, where the density of population in certain areas exceeds 125 per square mile, the people are almost exclusively Indians. Even in the city of La Paz, the actual capital (although Sucre is the legal capital), the Indians form the majority of the inhabitants. In the Department of La Paz, Indians make up about 75 per cent of the total. Lower down in the valleys and basins of the Eastern Cordillera there are more mestizos and Europeans: in the Basin of Cochabamba, for example, which has a density of population of over 325 people per square mile, 70 per cent is made up of mestizos and Europeans. With such differences of racial composition added to the contrasted economic outlook found among the various groups, the formation of a strong national unity is extremely difficult.

THE PHYSICAL DIVERSITY OF BOLIVIA

Bolivia, like Colombia, is about one-third mountainous and about two-thirds lowland; and the lowland two-thirds lies mostly outside of the effective national territory (Maps 1 and 6). Part of the plains of eastern Bolivia are drained by the headwaters of the Amazon, and part by the Paraguay and its tributaries. The plains in the southeast, south of Santa Cruz, are a part of the great lowland region known as the *Gran Chaco* (Map 48). But most of the Bolivians live in the one-third of the national territory which is mountainous.

It is in Bolivia that the highlands of the Andes reach their greatest width (Maps 6 and 34); about latitude 18° S., between Arica on the

HIGHLAND BOLIVIA
SURFACE CONFIGURATION
68°
64°
LAKE TITICACA
LA PAZ
T.
G.
THE
RIO LA PAZ
RIO BENI
YUNGAS
COROCORO
RIO DESAGUADERO
COCHABAMBA
CLIZA
SANTA CRUZ
ORURO
RIO GRANDE
18°
UNCIA
LAKE POOPO
SUCRE
SALAR DE COIPASA
POTOSI
ALTIPLANO
PUNA
SALAR DE UYUNI
UYUNI
THE
CHILE
BOLIVIA
PILCOMAYO
VILLA MONTES
TARIJA
THE
RIO LOA
22°
LA QUIACA
RANGES
CALAMA
BOLIVIA
ARGENTINA
CHILE
FRONT
CHACO
GRAN
THE
JUJUY
THE
SALTA
ANDES
PLAINS
INTERMONT BASINS
T. TIAHUANACO G. GUAQUI
0 SCALE 100
MILES

MAP 34

HIGHLAND BOLIVIA
NATURAL VEGETATION
68°
64°
18°
22°
22°
64°
CHILE
BOLIVIA
BOLIVIA
CHILE
ARGENTINA
SCALE
0
100
MILES
BARREN DESERT
XEROPHYTIC SHRUB
MOUNTAIN GRASSLAND
PUNA
PERMANENT SNOW
WET SAVANNA
SELVA
MOUNTAIN FOREST
TROPICAL SCRUB FOREST
EASTERN ANDEAN BORDER

MAP 35

Pacific coast and Santa Cruz on the eastern plains, the mountain zone is approximately 400 miles wide. The highlands of Bolivia are made up of three distinct parts: the Western Cordillera; a string of high intermont basins known collectively as the *Altiplano*; and the Eastern Cordillera.

The Western Cordillera is a southward continuation of the volcanic region which begins north of Arequipa in Peru. Along its crest are numerous active volcanoes, some of which, in the symmetry of their cones, rival the famous El Misti in Peru. East of the Western Cordillera are the basins of the Altiplano, the northernmost of which is occupied by Lake Titicaca. Spurs extending eastward from the Western Cordillera all but separate these high basins, but on the eastern side of the Altiplano, along the west-facing front of the Eastern Cordillera, there is a continuous passageway of gentle gradient which extends from the shores of Lake Titicaca southward across Bolivia.

The northern part of the Eastern Cordillera is a southeastward continuation of the high ranges of Peru. The mountains which stand northeast of the Titicaca Basin and of the city of La Paz are very high, some of them more than 21,000 feet above sea level; and the descent from these great elevations to the eastern plains is remarkably abrupt. This rainy and heavily forested northeastern slope of the Eastern Cordillera, which is the equivalent of the Eastern Border Valleys Region of Peru, is known in Bolivia as the *Yungas*.

A notable change in the character of the Eastern Cordillera takes place about latitude 17° S., where the predominant direction of the slope turns from northeast to east. A line drawn a little north of due west from Santa Cruz to the edge of the Altiplano, passing just north of Cochabamba, marks the approximate southern end of the Yungas. South of this line the Eastern Cordillera is composed of a great block of the earth's crust which has been tilted eastward, its upper surface sloping gently toward the eastern plains, its western edge forming a sharply defined escarpment overlooking the basins of the Altiplano. The top of this block, like the highlands of Peru, is composed of a high-level surface of slight local relief, standing, near the western border, between 12,000 and 14,000 feet above sea level. Above this surface there are irregularly placed and discontinuous ranges of high peaks, and below it are deeply excavated valleys and basins. This high-level surface in the Eastern Cordillera of Bolivia is known as the *Puna*.[1] Streams which drain eastward to the lowlands of eastern Bolivia have extended their headwaters

[1] The word *Puna*, designating a region, should not be confused with the same word used to designate a vegetation type (Map 35).

back into the Puna, a few of the larger ones even reaching the margin of the Altiplano. Generally, however, the Eastern Cordillera south of latitude 17° S. can be divided into a western high part where the Puna surface is only slightly dissected, and an eastern lower part where the streams have cut the Puna into long fingerlike remnants standing high between the valleys.

The northwest-southeast and the north-south surface features of highland Bolivia just described are crossed diagonally by the zone of aridity (Map 10). From about latitude 20° S., almost to the Strait of Magellan, the eastern base of the Andes is dry. As a result of this climatic arrangement, each of the major surface divisions of Bolivia can be subdivided into a northern wetter part and a southern drier part. Most of the people occupy the northern basins of the Altiplano and the basins and valleys of the Eastern Cordillera along the line of transition between the very wet Yungas and the very dry south (Map 37).

THE WESTERN CORDILLERA AND THE ALTIPLANO

For an agricultural or a pastoral people, the habitability of the western part of Bolivia decreases from northeast to southwest as aridity increases. The Western Cordillera has the smallest population of the highland regions, for here aridity and altitude are combined. In the northern part, north of latitude 20° S., several small rivers rise among the volcanic peaks, some draining westward toward the Atacama of Northern Chile, some eastward toward the Altiplano of Bolivia. In little valleys between 11,500 and 15,000 feet above sea level there are narrow ribbons of irrigated land on which meager crops of potatoes and hay are raised. Toward the south, where only rare sources of water are to be found, the land remains almost uninhabited except by occasional seminomadic shepherds (Map 36).

The Titicaca Basin

In the Titicaca Basin the conditions of life are not so extreme as in the Western Cordillera. The boundary of the zone of deficient moisture crosses the Altiplano about latitude 17° S.; north of that line the rainfall is adequate for the cultivation of crops without irrigation. Around the shores of Lake Titicaca extremes of temperature are moderated by the presence of the open water. Because the lake is very deep—about 900 feet at the maximum depth—the temperature of Lake Titicaca remains nearly constant throughout the year, at about 51°. As a result, the air

temperatures around the margins of the lake do not drop so low at night or in winter as they do at similar altitudes farther from the water. The surface of Titicaca is 12,507 feet above sea level; but maize and wheat can be ripened in the Titicaca Basin to an elevation of 12,800 feet.

These physical advantages for an agricultural people have been reflected since the earliest times of which there is any record by the presence of a relatively dense population around the shores of Lake Titicaca. This area of concentrated settlement formed the core of the ancient civilization whose ruined temples may still be seen on the promontories and islands of the lake. Along the railroad not far east of Guaqui are the ruins of the city of Tiahuanaco (T on Map 34), once the capital of a thriving pre-Inca state. The conquest of this densely populated district was one of the first steps in the expansion of the Inca Empire. As a result of the many centuries of sedentary agricultural settlement the inhabitants were so closely attached to the land that although the Spanish conquest in a sense flowed around them, it made but little headway in actual penetration. The district is still almost exclusively Indian: the farmers in the more remote parts of the Basin still own and operate their lands on the communal system in spite of the attempts made by the Bolivian government to enforce a system of private property. Today there are parts of the Basin where the population is more than 125 per square mile; all but the steepest promontories and ridges are covered with a "crazy-quilt" pattern of cultivated fields, terraced slopes, and scattered small villages.

The highland Indians of the Titicaca Basin remain subsistence farmers, little interested in contacts with international markets or in the problems of transportation to the coast, which would arise if they desired such contacts. These people are inland by disposition as well as by geographic location. They support themselves chiefly by their own crops of barley and potatoes and by their own domestic animals. The division of the Titicaca Basin by the boundary between Peru and Bolivia does not create the difficulties which would undoubtedly arise if the communities were not largely self-sufficient. The fact that this relatively dense cluster of people does not form the core of a political unit but is actually cut in half by an international boundary is an eloquent illustration of the extent to which the culture of the Spaniard has been superimposed on that of the Indian. Political boundaries and all that they stand for are Spanish importations. If they should pass away tomorrow, the Indian communities would be little affected. There is something impressive about the stability of a society which has survived with little change for so many centuries.

Indian Settlements South of Lake Titicaca

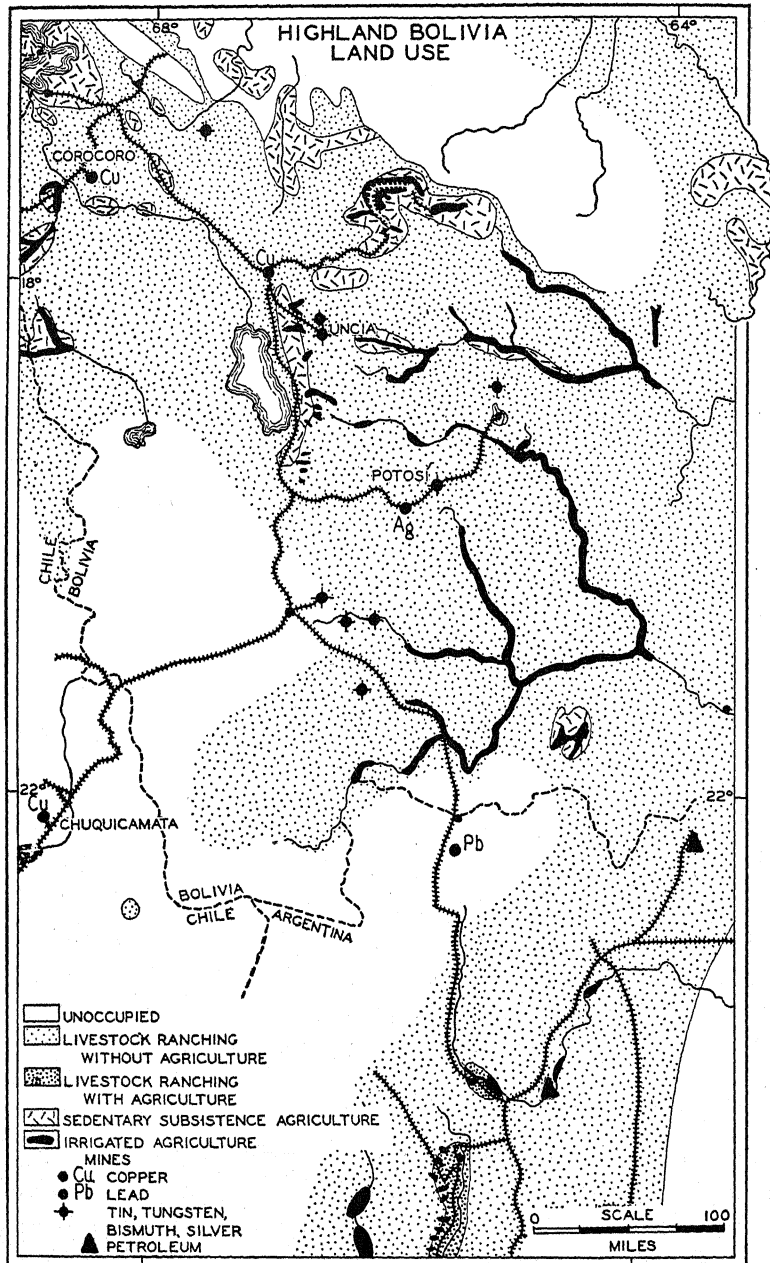
The number of agricultural Indian communities decreases south of the Titicaca Basin. Indian settlement, with a population density of between 10 and 25 per square mile, extends southward along the valley of the Río Desaguadero about as far as the margin of sufficient moisture (Maps 10 and 37). As the aridity increases the Desaguadero takes on the braided, shifting channel of a typical dry-land river, and the settlements along its banks are spaced at wider and wider intervals.

The Desaguadero drains into Lake Poopó. This lake is salty, for, although the waters of Lake Titicaca are fresh, the Río Desaguadero on its way south crosses saline beds from which a certain amount of salt is carried away in solution; but the saltiness of Poopó is also the result of the fact that the water escapes from it mostly by evaporation. Lake Poopó averages 12,120 feet above sea level but in times of flood it rises rapidly and may overflow into the Salar de Coipasa, a salt flat located to the southwest (Map 34). Still farther to the south the Salar de Uyuni is a great wind-swept salt flat, now totally arid. Since Lake Poopó is only about ten feet deep at the deepest part its waters change temperature rapidly and so exert little influence on the temperature of the air in its vicinity.

East of Lake Poopó there is a more or less continuous band of Indian settlements along the west-facing piedmont of the Eastern Cordillera (Map 36). Each stream which emerges from the mountains has built an alluvial fan, and on these fans the Indian communities have become established. The pattern of settlement differs from that of the Titicaca Basin, however, in that the villages are located high on the fan slopes where water is available, rather than close to the lake. The cultivated fields are located on the upper parts of the fans; the lower slopes where water is less certain are used for pasture. The marshy and salty shores of Lake Poopó are uninhabited.

Mining Communities of the Altiplano

In addition to the agricultural Indian communities of the Altiplano there are two clusters of population in this region which originated as mining centers. One of the oldest mining communities in this part of South America is located not far east of the Río Desaguadero and a short distance south of the main railroad line between La Paz and Arica. This is Corocoro (Map 36). Since the earliest period for which evidence is available there has been a mining population located here, for

HIGHLAND BOLIVIA
LAND USE
68°
64°
18°
22°
22°
COROCORO
Cu
Cu
UNCIA
POTOSI
Ag
CHILE
BOLIVIA
Cu
CHUQUICAMATA
Pb
BOLIVIA
CHILE
ARGENTINA
UNOCCUPIED
LIVESTOCK RANCHING WITHOUT AGRICULTURE
LIVESTOCK RANCHING WITH AGRICULTURE
SEDENTARY SUBSISTENCE AGRICULTURE
IRRIGATED AGRICULTURE
MINES
Cu COPPER
Pb LEAD
TIN, TUNGSTEN, BISMUTH, SILVER
PETROLEUM
0 SCALE 100
MILES

Map 36

this is one of the world's two sources of native copper (the other source being on the shore of Lake Superior in northern Michigan). Because copper was present here in pure form, not as an ore which had to be smelted, it was used by the native peoples long before knowledge of metallurgy made possible the utilization of other sources of copper. Corocoro is still exclusively a mining community, with a population of only about 4,500; from the group of mines in the vicinity comes about 90 per cent of the copper production of Bolivia.

The city of Oruro is the center of the other important mining community of the Altiplano. A range of low hills, about four square miles in area and rising some 1,200 feet above the general level of the Altiplano, contains ores of both silver and tin. During the colonial period this district was one of the chief sources of silver, and Oruro, located at the eastern base of the hills, became a town of considerable importance. But mining communities, with few exceptions, are subject to major fluctuations of prosperity and of population as a result of the speculative character of the business of seeking and selling the ores, especially in a land which is too high and too dry for the inhabitants to find other means of livelihood. With the decline of silver production during the nineteenth century the Indian workers moved away, and the community was largely abandoned; but with the rise of tin mining in more recent years, the community has once again regained its position of importance.

The status of Oruro at the present time as the third largest city of Bolivia, with a population of over 40,000, is a result of other activities than those related to mining. In the first place Oruro enjoys a position on what has been, since the conquest of this territory by the Incas, a major route of travel. The Altiplano, as described before, is not composed of one level and uninterrupted surface, as it is frequently shown to be on regional maps. The spurs and outliers from the Western Cordillera divide it into a number of more or less separate basins. Each basin is deeply filled with sands and clays deposited in the bottoms of the extensive lakes which occupied much of this territory during the glacial period. But along the eastern border of the Altiplano the several basins are connected, and a level route of travel is available from the southern end of the Titicaca Basin far to the south. This route is now followed by one of Bolivia's main railroad lines. Two major branches join this main line in the vicinity of Oruro: one serves the tin-mining district around Uncia in the Eastern Cordillera; the other reaches the important agricultural basin of Cochabamba, lower down on the eastern slopes (Maps 34 and 36). Oruro, as the focus of these routes, has become a supply center,

connecting Bolivia's most productive agricultural district with the most productive mining district.

La Paz

La Paz, political center and chief commercial city of Bolivia, is the world's highest big city. Located 12,000 feet above sea level, the 200,000 people of La Paz are wedged into a narrow valley in the Altiplano, where a tolerable compromise can be worked out between comfort and accessibility.

La Paz is quite literally in the Altiplano rather than on it. The traveler approaching the city from the port of Guaqui at the southern end of Lake Titicaca does not become aware of the presence of a large urban center (Map 34). The smooth surface of the Altiplano rises gradually toward the steep face of the Eastern Cordillera, known in this section as the *Cordillera Real*—a majestic mountain wall which is topped by the enormous snow-capped peaks of Illampú (21,276 ft.) and Illimani (21,184 ft.). Not until the station of El Alto is reached does the traveler find himself at the brink of a chasm which separates him by about three miles from the mountain front. At the bottom of the chasm, 1,400 feet below the rim of the Altiplano, but still 12,000 feet above sea level, lies the city of La Paz.

This remarkable site occupied by the city of La Paz is the result of river cutting. The Río La Paz, a tributary of the Río Beni and the Amazon, has cut headward from the rainy eastern slopes of the Cordillera Real through the heart of the range until its headwaters now include some of the streams descending westward toward the Altiplano. The gorge which the river has cut through the Cordillera is one of the most spectacular features in a continent where spectacular gorges are commonplace. From summit to summit along the crest of the range the gorge is only about twelve miles wide; but nearly 11,500 feet below the crest the river plunges through a narrow channel bordered by almost vertical cliffs, through an opening impassable for human beings. Where the headwaters of the Río La Paz have reached the loose lake-bed deposits of the Altiplano a deep chasm has been excavated parallel to the mountain front, and through this trench are diverted not a few of the streams which once fed Lake Titicaca. A less promising place for a large city it would be difficult to imagine.

The Spaniards, not the Indians, chose this site for La Paz. The native people regarded the deep trench along the front of the mountains as uninhabitable; likewise two other similar trenches, one east of the middle of Lake Titicaca (which lies north of the northern margin of the area

shown on Map 34), and the other far to the south, east of Uyuni (Map 34), also remained unoccupied. But for the Spaniards this site combined accessibility to the chief colonial route of travel with a measure of protection from the cold winds of the Altiplano. The main colonial road from Lima to the silver mines of highland Bolivia passed Lake Titicaca on the southwest side, where the spurs which reach the edge of the water are fewer and less rugged than those on the northeast side. Emerging from the Titicaca Basin, the road led over to the eastern side of the Altiplano where the way to the south was open. This brought the main line of travel to the very edge of the chasm. No other site could so readily combine accessibility to the road with shelter from the winds. Once established, this city controlled the passage of goods to and from Lima; and later, when railroads were built, they were all brought to a focus on La Paz.

But the site has proved anything but favorable for the growth of a large city. The cramped space in which the buildings are wedged, necessitating a departure from the strictly rectangular pattern usual in Spanish American cities, has handicapped growth. Nor is the climate, even in this protected spot, easily to be endured: the rapid changes of temperature together with the rarefied atmosphere make respiratory diseases not only common but extremely dangerous. Only the most phlegmatic persons can long remain at these altitudes without showing evidences of nervous strain. In almost every respect La Paz is unsuited for the role of chief city, and its continued pre-eminence is indeed a measure of the difficulties of reaching the comfortable valley communities of the eastern slopes.

THE EASTERN CORDILLERA AND THE PLAINS

La Paz, then, was established along one of the major trade routes of colonial South America—a route which connected the primary settlement center on the West Coast with the rich mines of the Bolivian Highlands, and led on southeastward to the plains of Argentina. At one end of the road was Lima, the center of Spanish colonial life. The major objective of the road in what is now Bolivia was the silver-mining community of Potosí.

Mining Communities of the Eastern Cordillera

In 1544 the Spanish conquerors of Peru in their restless search for El Dorado discovered the Cerro Rico, a conical mountain which stands above the Puna surface of the Eastern Cordillera. The top of this moun-

tain reaches 15,680 feet above sea level, and the altitude of its base, where the city of Potosí was founded, is 13,780 feet (Map 34). The bulk of the mountain is made up of one of the richest ore bodies known anywhere in the world—an ore containing not only silver, but also tin, bismuth, and tungsten. In 1544, however, the Spaniards wanted silver, for tin was then much more cheaply supplied to Europe from European sources, and bismuth and tungsten had no uses. Out of this one mountain, between its discovery and the beginning of the seventeenth century, came about half of all the silver produced in the world during those fifty-six years. The "royal fifth" which was poured into the Spanish treasury played a vital role in shaping the course of European history.

The desire for wealth can lead some men to endure the most severe hardships and, at least temporarily, to overcome the most severe handicaps. The mining town of Potosí at one time had 160,000 people in it despite the fact that the climatic conditions at this place were such that La Paz must have seemed blissfully comfortable by comparison. The average winter day, according to recent figures (80), ranges in temperature from about 3° to 45°, and snows are not uncommon. Moreover the colonial engineers faced a difficult problem in providing power for the mines and the ore crushers. Fuel on the highlands is scanty; even today the mines are forced to depend for fuel on such resinous plants as *yareta*, gathered from great distances at what would be enormous cost were it not for the cheapness of Indian labor, and on equally scanty supplies of *taquia*, the dried dung of llamas. These fuels were useless to the sixteenth-century colonists, however, for at that time there was no knowledge of steam power. Instead, the engineers of Potosí devised a water-power system by building more than thirty small reservoirs in the neighborhood which provided enough water to turn the wheels of more than a hundred mills.

Potosí, after its dazzling rise to wealth, suffered the fate of most mining communities. Exhaustion of the more immediately available ores, advances in technology that made possible the use of other poorer ores in more accessible locations, combined with a series of natural disasters at Potosí—including the flood of 1626 when one of the dams above the city broke—combined to put an end to the pre-eminence of this one place. First Peru and then Mexico took the lead in the production of silver; Potosí began to decline in population since no other means of support could be found in such a locality. For more than two centuries Potosí remained a ghost town, occupied by no more than a few hundred people in the midst of the ruins.

Shortly before the beginning of the present century the exploitation of Bolivia's tin ores began. Increasing demand resulting from new industrial uses, together with the exhaustion of the more accessible European sources, led to a rise in the market price of tin. The average price for the period from 1924 to 1933, for example, was more than double the average of the decade from 1894 to 1903 (25). The result was a reawakening of mining activity around the ancient silver town of Potosí. Today this place has a population of nearly 36,000.

Other mining communities in the Eastern Cordillera of Bolivia are now more important than Potosí. Mines have been opened up by North American, British, Chilean, and Bolivian companies, especially in the district which lies east of Oruro. The tin mines around Uncia (Map 36) are associated with the fabulous story of the rise of Señor Patiño, a Bolivian who is reputed to be one of the world's richest men. From the Patiño mines now comes more than half of Bolivia's tin production. At first only the richest ores were exploited, and production reached a maximum of 47,079 metric tons in 1929. Since 1930 several difficulties have beset the tin producers. In addition to the world depression, and the threatened exhaustion of the richer ore bodies, Bolivia, between 1932 and 1935, was engaged in a war with Paraguay which not only was ruinous to the country financially, but also took away many of the Indian laborers from the highland communities. When tin quotas were fixed by international agreement, Bolivia was unable to fill its quota because of shortage of labor. In recent years, however, these difficulties are being overcome by the return of workers from the disbanded army, and by the use in the Patiño mines of the latest labor-saving devices for the recovery of low-grade ores. Reliable estimates at present indicate that Bolivia could continue to produce at least 40,000 tons a year for a long time.

Tin is not the only mineral extracted from the mines of the Eastern Cordillera. Silver is still produced, and stands second on the list; but of greater potential value are the industrial metals—tungsten, antimony, lead, zinc, and bismuth. The high cost of mining and transportation in Bolivia, as well as the existence of more accessible ores in other parts of the world (tin in Malaya, tungsten in China), has retarded the development of mining in Bolivia. The current period of international conflict is giving a new, and perhaps temporary, strategic significance to mines of this rich but remote region.

In all these mining communities the bulk of the population is pure Indian, and Indians perform all the labor. Inefficient as the Indian workers undoubtedly are, the low wages they receive compensate, in part,

for their low productive capacity. But the supply of workers is chronically inadequate. The Indians, moreover, cannot be made to see the advantages of hard labor in the mines, for their wants do not include things which can be attained in this way; they are content with a chew of coca leaves, and with periodic *fiestas* which provide occasions for orgies of drunkenness, and they face the hardships of their comfortless lives with stolid indifference. Whether poverty produces these Indian characteristics, or the characteristics produce poverty is a question seldom asked and never answered.

Agricultural Communities of the Eastern Cordillera

The densest clusters of rural people in Bolivia are found in the intermont basins and valleys at lower altitudes in the Eastern Cordillera. The population in these valleys, moreover, includes a larger proportion of Europeans or strongly Europeanized mestizos than is to be found in the other population clusters of Bolivia. The communities in the larger basins of Cochabamba, Sucre, and Tarija, together with many smaller communities in this general region, form the heart of the Bolivian state, for here are to be found the majority of the people for whom the sentiment of nationality has much real meaning. If some of these people reside temporarily in La Paz, their homes are nevertheless in the communities of the eastern slopes.

The valleys of the Eastern Cordillera south of the Yungas have been cut into the Puna surface by two chief river systems: one is the Río Grande, a tributary of the Río Mamoré, the Madeira, and the Amazon; the other is the Río Pilcomayo, a tributary of the Paraguay, the Paraná, and the Plata. The valleys in the Eastern Cordillera are of irregular width. There are places where they are narrowly constricted as the streams pass over stretches of resistant rocks; upstream from such places, however, the valleys generally broaden out to form long ribbons of flat land, or, in a few instances, relatively wide valley basins. For the most part the streams follow very winding courses, even where they are deeply intrenched in the Puna surface—a feature which the physiographers describe as "intrenched meanders." The valleys and basins have been excavated several thousand feet below the Puna surface. They form irregularly shaped belts where the temperature is considerably higher than that of the Puna country on either side. Since the streams carry an abundant supply of water, especially during the rainy summers, irrigation is possible even where the local rainfall is low (Map 36).

Cochabamba, Sucre, and Tarija

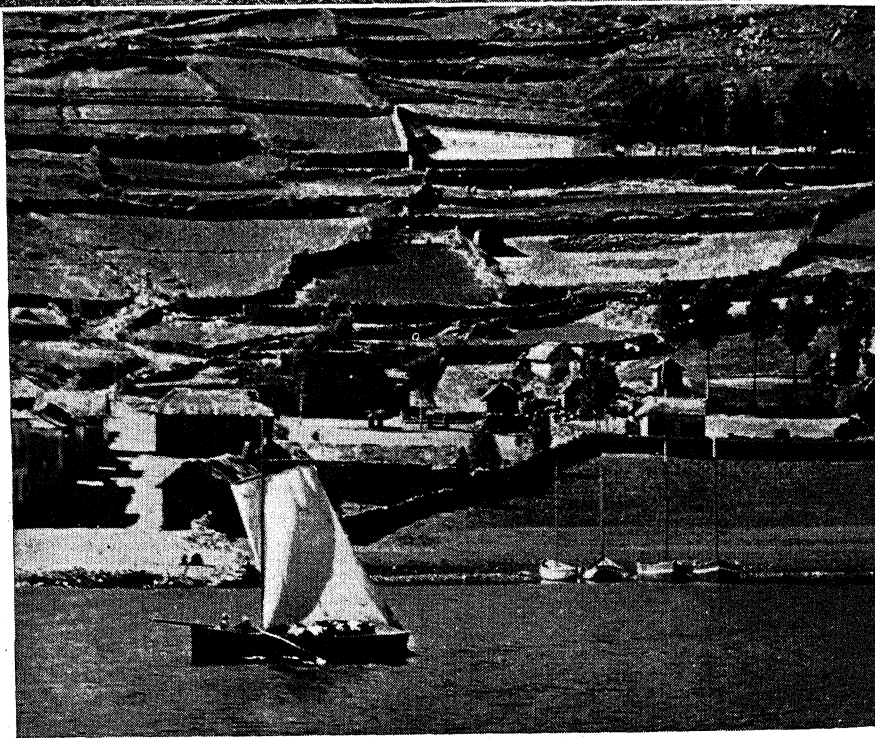
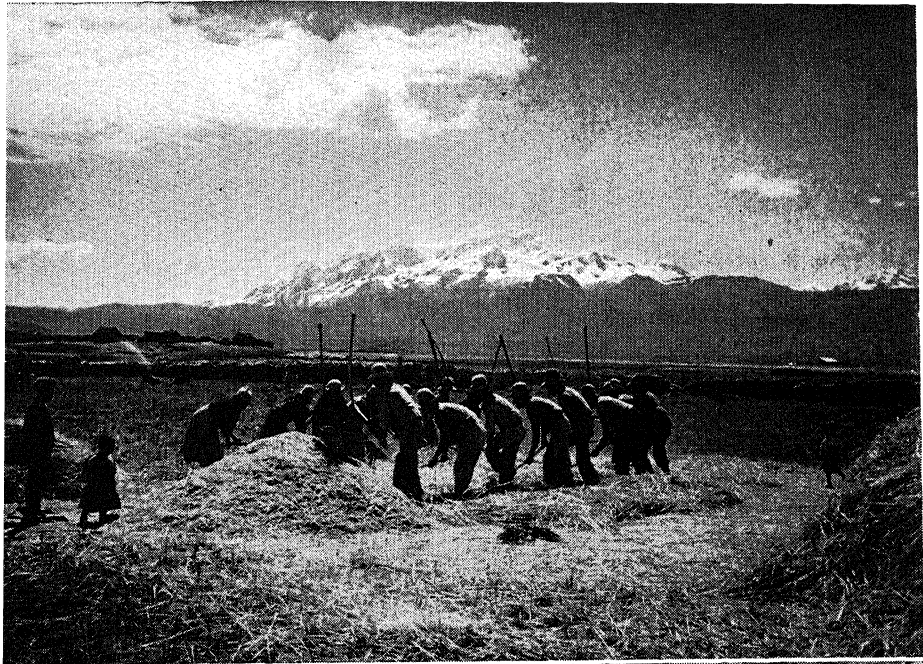
The largest concentration of settlement in Bolivia is in the Cochabamba Basin (Maps 34 and 37). On the level floor of this basin, which is about fifteen miles long by six miles wide, there is a rural population of more than 325 per square mile. The city of Cochabamba, with 52,000 inhabitants, is the second city in Bolivia.

There can be no doubt that living in Cochabamba is much more comfortable than living in the highland towns. Cochabamba is only 8,500 feet above sea level and the average temperature of its coldest month is 57°, as compared with 43° at La Paz. A variety of crops can be raised in the surrounding rural district, including maize, barley, alfalfa, and fruit. In this part of Bolivia the Europeans and the mestizos who have adopted the European way of living have entirely abolished the Indian system of land tenure; the agricultural lands are divided into large properties on which the Indians live and work as tenants or peons.

The other basins and valleys of the Eastern Cordillera are similar in general character (Maps 34 and 36). Sucre, long designated hopefully as the legal capital of the country, occupies a basin which, although smaller than that of Cochabamba, is also crowded with a dense agricultural population. The Basin of Tarija, still lower down on the eastern slopes, is famous for its fine vineyards and orchards of olives, pears, peaches, and apples. Both Cochabamba and Sucre have been able to market grain and cattle in the high mining communities, with which they were long connected only by trails, but Tarija finds great difficulty in sending its products outside the immediate locality. The narrower valleys, not wide enough to be called basins, yet still wide enough for cultivation, are followed by many miles of ribbonlike farms. Here indeed are the garden spots of Bolivia.

Problem of Accessibility

Settlements by people who practice the European way of living, however, do not prosper in isolation. The desire for a money profit, and for the purchase of goods produced in other regions, rather than for a purely subsistence type of economy, is one of the traits which distinguish the Europeans from the Indians. Comfortable and productive as these eastern valleys undoubtedly are, the problem of providing them with transportation has yet to be solved. Such products as coca, cacao, and coffee, which can stand high transportation costs because they have a high value per unit of weight, cannot be grown in the country south

Bolivia's most important city is La Paz. Even politically it is more important than the legal capital, Sucre. La Paz is the highest "big city" in the world; it is crowded into a narrow valley nearly 12,000 feet above sea level. In the foreground of the picture above we see La Paz's one wide avenue, the Avenida 16 de Julio. In the background is the edge of the Altiplano. Bolivia's most im- ... world's major sources

In the upper picture are seen Indians threshing grain on the Bolivian Altiplano, near the southeastern margin of Lake Titicaca. This lake has the effect of moderating the extreme temperatures of the highlands, and thus making possible the ripening of maize at 12,000 feet above sea level. In the background is the snow-covered Cordillera Real. (Courtesy of Pan American Airways.) In the region around the shores of Lake Titicaca (*below*) we see a "crazy-quilt"

of the Yungas because of the increasing aridity. For such bulky products as grain, or such perishable products as fruit, a cheap means of transportation is essential.

The chief difficulties which stand in the way of transportation development are not only the rugged terrain and the steep grades necessary to reach the Altiplano, but also the geographical arrangement of the settlements themselves. The focus of economic and political power is not sharp, because the people of this core of the Bolivian state are scattered in numerous relatively small communities, each anxious for government support of local projects, but each ready to block the projects which bring advantages only to other communities. The largest cluster of people is in the Cochabamba Basin, and although the density is high in this basin the area is not great. The other communities are still smaller, many of them strung in narrow bands along the winding valley bottoms. The physical difficulty of providing these scattered communities with a common political and economic focus, of gathering enough of the products of the Eastern Cordillera together in one place to pay for the expensive construction of railroads, is one which remains unsolved.

The story of the attempt to provide Cochabamba with a rail connection with the highland mining centers illustrates the difficulties involved. Between 1913 and 1917 work on a railroad was in progress. In anticipation of the final solution of the problem of access to a market, there was a land boom in the Cochabamba Basin. Despite the reluctance of landowners to sell even parts of their estates, certain pieces of land actually were sold, but for prices ranging as high as $2,000 an acre. But the railroad, which cost more than $154,000 per mile, had either to tap a large volume of traffic or charge very high rates. The area served could not provide enough traffic to make low rates economically possible, and high rates prevailed. Thus as a result of costly transportation, heavy mortgages, and high land valuations, only losses came to the landowners. The general depression which followed cast a gloom over the community from which it has scarcely even now recovered. Later when the railroad was extended eastward to Cliza, there was no land boom in that district.

Settlements in the Northeast of Bolivia

The population of the other parts of Bolivia is small. The vast expanse of territory east of La Paz, Cochabamba, and Tarija can be divided roughly into a northeastern part which is rainy and a southeastern part

which is relatively dry. In both divisions the chief spots of settlement are either within the mountain country or along the piedmont where the mountains border the eastern plains. Much of the land which extends far to the east to the borders of Brazil and Paraguay lies outside of Bolivia's effective national territory.

The Bolivian Yungas forms a very distinct natural division of the country. The region includes the northeastern slopes of the Cordillera Real northeast of La Paz, and north of Cochabamba. As a matter of fact, the Yungas forms the southern extremity of a region which extends unbroken along the eastern Andes from Colombia, across Ecuador and Peru, as far as Santa Cruz (Map 7). In Peru this rainy and densely forested region is known as the Eastern Border Valleys, and in Ecuador as the Oriente. The much narrower fringe of woodland which continues south of Santa Cruz along the mountains well into Argentina is composed of a lighter type of forest (Map 35).

At the top of the Yungas stands the narrow but towering Cordillera Real. The pass by which access to the Yungas is gained from La Paz requires a climb to an elevation of over 15,000 feet. Then, on the eastern side, the drop to the lowlands of the Río Beni is amazingly steep. Here in a distance of only fifty miles there is a descent of 14,250 feet. The Yungas Railroad, if completed, would have the longest stretch of 6 per cent grade of any railroad in the world.

A belt of sandstone ridges through which the Río Beni and its tributaries pass in a series of water gaps marks the foothills zone of the Andes. Beyond lie the eastern plains, covered partly with selva, partly with wet savanna (Map 35). These plains of northeastern Bolivia, together with the neighboring part of southeastern Peru, suffer from extreme isolation, not only because of the steepness of the mountain barrier to the west, but also because the Río Madeira, which gathers the water of the Madre de Dios, the Beni, and the Mamoré, is interrupted by a long stretch of rapids as it flows northeast toward the Amazon. The Madeira-Mamoré Railroad fails to reach the lower end of navigable water on the Beni at Riberalta (Map 103).

Three different kinds of products have attracted settlers to the Yungas and to the plains beyond. Among the earliest sources of wealth in this region was gold. The gravels of the Río Tipuani, located about sixty miles east of La Paz, within the zone of the Front Ranges, proved to contain large quantities of this metal; up to 1800, while Bolivia was producing about 10 per cent of the total gold production of South America, the Yungas was the chief Bolivian source; even today placer works along

the Río Tipuani are still active. All of the workers must be recruited in the Indian communities of the highlands in spite of the fact that the Quechuas and the Aymaras do not adjust themselves easily to the warm, humid conditions of the northeast.

Settlers have also been attracted to the valleys of the Yungas at intermediate altitudes, roughly from two to six thousand feet, by the possibilities of producing coca, coffee, and sugar. These products, like gold, have less difficulty in supporting the high costs of transportation than do the bulky products of the Eastern Cordillera south of the Yungas. Coca leaves have continued to find a steady demand among the highland Indians, as they did in the period before the arrival of the Spaniards; sugar, converted into sugar brandy, also finds a market steady enough to permit shipment from the Yungas. As in the Eastern Border Valleys of Peru, however, the system by which the relatively few landowners are enabled to make a profit is based on the exploitation of Indian labor—on production from which the costs of land and labor are all but eliminated.

Cinchona bark and rubber are the third sources of wealth which have attracted settlers to the northeastern part of Bolivia. Highland Indians were called upon to collect these wild products from the selva; and many of the communities at the intermediate altitudes in the Yungas were all but abandoned in the rush for new profits. But first cinchona and then rubber was virtually eliminated as a South American product by the cheaper plantation methods of Malaya, Sumatra, and Java. Before 1912, when South American production began rapidly to decline, rubber was so valuable that expensive railroad projects were undertaken, such as the line from La Paz. The Brazilians, as part of the payment for Acre Territory (Map 78), agreed to build a railroad around the Madeira Rapids to give eastern Bolivia access to ocean shipping. The collapse of the rubber business in the Amazon came before this line had been completed to Riberalta, which is at the lower end of navigation on the Río Beni.

The scattered settlements grouped along the rivers of northeastern Bolivia remain all but lost in the wilderness. Small quantities of high-quality rubber are still collected; the wet savannas are used for the grazing of cattle under difficulties which are similar to those encountered in the Llanos of the Orinoco; along the lower Beni, groups of self-sufficient Japanese farmers have been established in recent years. But whatever may be the possibilities of settlement in this region in terms of agricultural productivity, the problem of overcoming transportation difficulties remains unsolved.

Settlements in the Southeast of Bolivia

The southeast of Bolivia differs from the northeast in that it is relatively dry, and becomes drier as one approaches the Argentine border. The line of division between the northeast and the southeast can be drawn approximately along the latitude of Santa Cruz. Along the lower eastern mountain slopes, south of Santa Cruz, the wet forest occupies only a narrow band which continues southward well into Argentina (Map 35). Most of the piedmont zone of the Andes, like the plains which stretch eastward to the Río Paraguay, is covered with dry scrub forest and patches of dry savanna. The Front Ranges are composed of parallel ridges or cuestas of brilliant red sandstone, with broad longitudinal valleys from two to fifteen miles in width. A trellis pattern of rivers is developed, with the main streams crossing the ridges in water gaps so narrow that access to the neighboring valleys must be gained by climbing over the intervening ridges rather than by following the rivers. The eastern plains form a part of that large area, shared by Bolivia, Paraguay, Brazil, and Argentina, which is known as the Gran Chaco (Map 48).

The one large concentration of settlement in the southeast of Bolivia is around the town of Santa Cruz, which was founded in 1560 by settlers who came from Asunción. Its location, about twenty miles east of the front of the mountains, and about opposite the southern end of the dense rain forest of the Yungas, gives it a potentially strategic position between contrasted regions—between mountains and plains, and between areas of abundant rainfall and areas which border on aridity. For the present, however, Santa Cruz remains the isolated center of a small farming community, in which the chief products are sugar, rice, coffee, and cattle. Santa Cruz is a town of about 30,000 people.

The settlers of the piedmont zone entered the region from two chief centers: from Santa Cruz in the north, and from Tarija in the south. Villa Montes, located a little east of the gap through which the Río Pilcomayo emerges from the last ridge of the Front Ranges, is the only settlement of importance. The Indian population, which is vastly in the majority, is made up of *Guarani* who had migrated westward from the country on the other side of the Río Paraguay during the Inca period (Map 4). Gathered together around missions established by the Franciscans, the Indians were decimated by epidemics of smallpox and other diseases. The region is reputed to offer excellent opportunities for settlement if only the problem of transportation could be solved. Today the best outlet is offered by a road, passable for oxcarts, which

leads southward along the piedmont to the head of the railroad in Argentina. Life in this region has been dislocated by the recent war with Paraguay.

The future of the southeast of Bolivia is involved with the exploitation of apparently very large reserves of petroleum. Until the concession was recently confiscated by the Bolivian government, a North American oil company held the land in a zone some ten to twenty miles wide along the Andean piedmont, although only a few exploratory wells had been sunk. The development of the field must await the construction of pipelines, whether to Brazil or to Argentina. Who will actually exploit the oil? From what source will come the labor? By what route or routes will the oil be exported? And, in the end, who will reap the rewards? All these problems remain for the future; and since so many unsettled questions are focused on a territory which is sparsely inhabited, which is claimed by two states, and which is so very difficult to reach from the population centers of the state which now controls it, the possibilities of serious friction in the future are obvious. Bolivia and Paraguay are the states directly involved in the territorial dispute so far; but both Brazil and Argentina have extended long railroad lines to the eastern and southern borders of the Chaco, and would no doubt be concerned in any rapid development of this region. Geologists believe that along the Andean piedmont of the Chaco is one of the world's largest undeveloped sources of petroleum, and that this part of South America is likely to be the scene of a boom development in the not distant future.

BOLIVIA AS A POLITICAL UNIT

To the great majority of Bolivia's three and a half million inhabitants the problems of commerce or of foreign or domestic politics have little meaning. Most of the Bolivians are subsistence farmers or shepherds whose world is bounded by the horizon—people who are inland in point of view as well as geographic location. To a small minority of the Bolivians questions of commerce, of domestic politics, and of relations with other states are of vital importance. Bolivia considered as a sovereign political unit involves the activities of this minority.

Since the days of the Spanish conquest the costs of government have been supported by a succession of commercial products, each of them produced by a relatively small proportion of the inhabitants. Until 1800, silver was by far the leading item, and during the sixteenth century was of fabulous value. During the nineteenth century, after Bolivia

had started its existence as an independent political unit, the chief government revenues were derived from taxes on coca and nitrate, and from a government monopoly of cinchona collections. The nitrate industry was lost as a result of the War of the Pacific; the cinchona monopoly collapsed with the rise of the Javanese plantations, although its loss was partly compensated up to 1910 or 1912 by taxes on rubber exports. During the present century minerals have again come to the front, led by tin.

The present foreign exports of Bolivia come almost entirely from the mines. During the 1930's minerals made up about 98 per cent of the value of all exports, and tin alone accounted for from 70 to 75 per cent of the total. In 1938 Bolivia produced 95 per cent of the tin of Latin America, and was the second source of this important metal in the world—Malaya and The Netherland Indies being the other chief producers. Most of the Bolivian exports went to England, which, before the outbreak of the Second World War, held a virtual monopoly of the tin-smelting industry. No smelter exists in Bolivia. In England the chemically complex Bolivian ores are mixed with the purer ores from the placer mines of southeastern Asia. Although the United States consumes some 60 per cent of the world's tin, techniques had not been developed before the beginning of the Second World War which would permit the smelting of the Bolivian ores alone, and North America remained dependent on the English smelters. In considering the possibilities of the development of a tin-smelting industry in the United States on an economic basis, we should not overlook the high costs of production in Bolivia, nor the fact that after quotas were fixed by international agreement, Bolivia because of labor shortage has been unable to meet the amount allotted to her except in one year (1938).

The small minority of the Bolivians who are interested or involved in these problems must face as one of the major difficulties standing in the way of the rapid economic development of their country the question of transportation—of access to the coast. So isolated are the scattered clusters of people not only from the outside world but also from each other, that the profits of commercial enterprise are devoured by the expenses of shipment. This is a problem with which the Bolivians have struggled for centuries, and it is still a problem which defies solution.

Routes of Access to the Highlands

Four chief routes of access to the highlands have been utilized since the beginning of the colonial period. Three of them connect Bolivia

with the Pacific ports of Mollendo, Arica, and Antofagasta; the fourth route follows the old colonial highway into Argentina. Along all four of these routes railroads have now been built (Maps 36 and 38).

The flow of traffic between the settlements which form the center of the Bolivian state and the coast has shifted from time to time as the various railroads have been completed. The first railroad to be built, in 1874, was the line from Mollendo to the port of Puno on Lake Titicaca (Map 29). Shortly after this, steamer service was inaugurated on the lake between Puno and Guaqui. By 1902, railroad and boat provided a relatively fast connection between La Paz and the sea, and for a time the copper from Corocoro was sent out by this route instead of over the old mule and llama trail to Arica.

Meanwhile, in 1889, a railroad was built from Antofagasta to Uyuni, and was extended in 1892 to Oruro and in 1910 to La Paz. The opening of this line drained off all the mineral production of southern Bolivia, in spite of the fact that in 1884 Bolivia had lost to Chile its seaport, Antofagasta. The third railroad to reach the highlands was built from Arica to La Paz in 1913, with a short spur to Corocoro. This railroad, which makes use of a long section of rack and cog, is by far the shortest of the three routes to the Pacific. Arica is now constituted as an international port with a Bolivian custom house. In spite of the fact that it remains outside of the Bolivian national territory, this port is once again becoming the chief outlet on the Pacific, regaining a position it held during the colonial period when it was reached by mule trails not only from La Paz but also directly from Oruro.

The railroad which extends southeastward to Argentina, by way of La Quiaca, Jujuy, and Tucumán, was completed in 1925. This is now competing, but not with great success, for a share of the exports which originate south of Potosí.

These various rail connections have had the effect of stimulating the mineral industries of the Bolivian state, but they have proved too costly to be of much service in the shipment of goods of little value per unit of weight; for the great majority of the Bolivians, mules still furnish the chief means of transportation. Indian fairs held in different parts of the country each year have survived the construction of railroads and the growth of commercial towns. One famous fair, for instance, is held annually at the little Indian village of Huari, located near the southeast end of Lake Poopó. To it are attracted several thousand people, and goods not only from the Altiplano but also from the eastern plains beyond Santa Cruz, and even from the plains of Argentina far to the south, are on

display. In a sense, two commercial systems exist together in the same area, serving the two contrasted parts of the Bolivian population.

Inland Bolivia

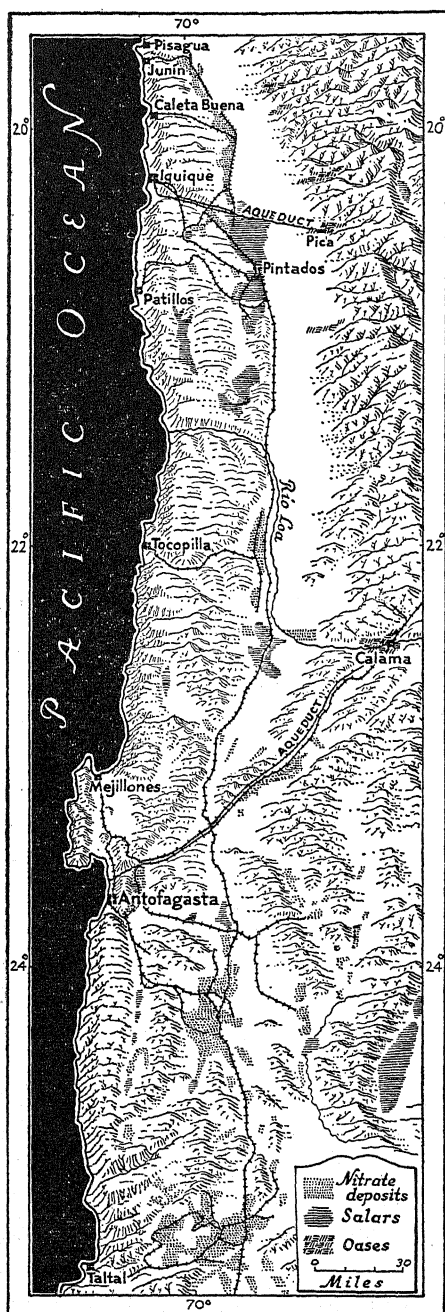
Although Bolivia for various reasons has failed to develop any strong feeling of national unity, there is one policy on which the people who control the destinies of the country seem at least to agree. Bolivians feel that they have been made the victims of territorial conquest by their neighbors. Whatever may have been the causes and conditions by which Bolivian territory was little by little taken away so that Bolivia was deprived not only of its coast, but also of some of its potentially rich eastern area, the fact remains that this process has gone forward so far that Bolivians are ready to support a long and costly war rather than yield more. The loss of the province of Antofagasta to Chile in 1884 is not disputed, although the grant of free access to the sea through Arica does not satisfy Bolivian sentiment. The loss to Brazil of the Acre territory in the Amazon, for which Brazil paid, is similarly not a question of controversy. But when Paraguay began to push the settlement of immigrant colonists in the part of the Chaco claimed, but not effectively occupied, by Bolivia, the Bolivians resorted to war. That loans could have been negotiated to supply the army with the latest military equipment is an amazing thing, especially as Bolivia was deeply in debt to foreign bankers before the war started. Perhaps the war represented for the average rather uninformed Bolivian the latest phase of the struggle against isolation; but it has ended disastrously.

Bolivia's capacity to expand into the Chaco and make this region part of the effective national territory is questionable. The Bolivian centers of population, diverse in composition and economy, scattered in location, are all isolated from the outside world by major physical barriers. Nor are these centers large enough to provide the source of settlers in numbers sufficient to turn the Chaco to effective use. That the Chaco is physically suited for agricultural and pastoral colonization is generally believed, but colonists who might enter this region are not likely to come from Bolivia. Paraguay has placed a few new pioneer settlements in the Chaco during recent years, but Paraguay, too, is a small and not very wealthy country. On either side stand the great nations of Brazil and Argentina, with railroads already extended almost to the borders of Bolivia. The weak hold of Bolivia on this potentially rich territory could easily lead to further dangerous disputes, especially when and if the exploitation of the oil resources gets started.

7

THE ATACAMA

THE DESERT REGION of Northern Chile, which is known as the Atacama, is one of the most distinct natural divisions of the South American continent (Map 38). Here is to be found one of the very few spots on the face of the earth where no rain has ever been recorded, and where the surface of the land remains barren over vast areas. Here the two chief groups of people who have occupied the desert have done so in strongly contrasted ways. The Indian settlements, closely attached to the sources of water, have remained isolated, static, unchanging; the Europeans, after neglecting the region for centuries, suddenly acquired a strong interest in the desert because of the discovery of its unique resource, sodium nitrate. But while the Indian villages survived the passage of the centuries almost unchanged, the Europeans, during the last century, "conquered" the desert in a spectacular wave of settlement and exploitation only to find that their occupation of the region was precarious. Disputes and conflicts over questions of ownership led to actual warfare in which Chile was victorious over Peru and Bolivia; and more recently the Europeans in the Atacama have had to face the problem of markets, a problem which arises largely from economic and political conditions outside of the region and beyond the control of the Chileans.

So individual are the characteristics of this northern part of Chile that it seems desirable to deal with the Atacama separately before turning to a discussion of the Chilean nation as a whole.

MAP 38. THE ATACAMA
(Courtesy of Ginn and Company.)

The Coast

No part of the West Coast of South America is more forbidding, more utterly desert-like in aspect, than the stretch of about six hundred miles between Arica and Caldera. From the water's edge the cliffed escarpment of the Coastal Range rises like an unbroken wall two to three thousand feet above the sea. Only one river, the Río Loa, makes its way across the desert and through the Coastal Range to empty into the sea. There are no harbors, no protected anchorages. Along the lower slopes of the coastal escarpment there are narrow wave-cut terraces, now lifted above the sea by the gradual emergence of the land; and on these narrow shelves, clinging with an insecurity that is more than apparent—for there are earthquakes in this region—are such towns as Pisagua, Iquique, Tocopilla, Mejillones, Antofagasta, Taltal, and Caldera.

Ocean vessels do not tie up at docks along the coast of Northern Chile. The steamers ride at anchor, half a mile or more offshore, rolling in the restless swell which moves the surface of the Pacific even in fair weather. All connections with the land are by means of

small boats and lighters, which alone can get inside the breakwaters—if, indeed, breakwaters have been built at all. The transfer of goods and passengers is a hazardous undertaking under the best conditions, and there are occasions when boats must wait for days until the waves subside and landing operations can be resumed.

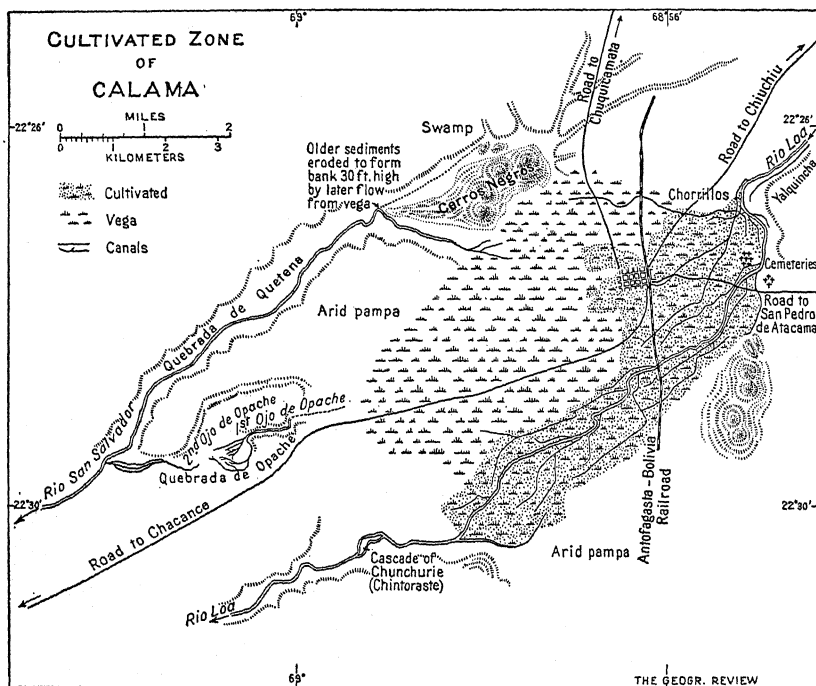
The ports along this coast are not all small ones. Some are large cities with imposing buildings, paved streets and parkways—all in apparent defiance of the surroundings. Each city, large or small, must be supplied with building materials, food, and even water, from distant sources. Yet Antofagasta is a city of more than fifty thousand inhabitants, and Iquique is not much smaller.

The Desert

The wealth of the Atacama, for a people of European culture, lies back of the Coastal Range. Each port is dependent on its connections with the mining districts of the interior, and these connections are maintained either by railroad or cable line. The railroads zigzag up the steep escarpment which faces the Pacific, passing over the crest through shallow, dry ravines about two thousand feet above sea level. East of the Coastal Range a very different kind of landscape is found. A series of dry basins, or *bolsons*, some fifty miles in width and approximately two thousand feet in elevation, separate the Coastal Range from the base of the Western Cordillera of the Andes. The Coastal Range consists only of a rim of low, rounded hills between the smooth-floored bolsons of the interior and the sharp drop to the Pacific. The bolsons are invaded on the east by enormous alluvial fans which spread out from the mouths of the Andean valleys and extend into the basins for as much as forty miles west of the mountain front. The lowest parts of the bolsons, therefore, are near their western sides, close to the rim of hills at the crest of the coastal escarpment. Many signs indicate that at one time these basins were filled with lakes, but with increasing aridity the water has completely disappeared. In the old lake beds the salts contained in the lake waters were deposited. A series of layers are recognized, one of them containing the valuable *caliche* which is composed of sodium chloride, sodium nitrate, and a variety of other substances including iodine salts. The caliche layer varies in thickness from a few inches to many feet, with an average of perhaps one foot.

The Atacama is now one of the driest places on earth. For years at a time no rain falls, so that the average figures of rainfall are quite meaning-

less. In the twenty years from 1899 to 1919, for instance, fourteen years passed at Iquique without a drop of rain, and during the six years in which some rain did fall the total amount was only 1.1 inches. Back of the Coastal Range, at Calama, no rain has ever been recorded.

Although the coast and the interior are alike in having this rainless condition, in other ways they differ considerably. The coast has a much higher relative humidity. Iquique averages about 81 per cent, while

Map 39

(Courtesy of the *Geographical Review*, published by the American Geographical Society of New York.)

Calama averages only 48 per cent. The cloudiness on the coast is high, while the interior remains almost cloudless. The temperatures on the coast are more uniform than those of the interior; the latter show a greater range, not only between seasons, but also between day and night. Under the clear skies in the interior the rapid loss of heat at night and in winter often brings the temperature close to the freezing point; at such times low fog banks hang over the desert, soaking the surface with dew. Both the coast and the interior are entirely barren of vegetation.

Permanent settlement in a desert is dependent on water, and supplies

of surface water in the Atacama are meager. Tacna is the southernmost of the Peruvian oases, and just across the border in Northern Chile is its twin—Arica. Between Arica and Copiapó only one river gathers sufficient volume in its headwaters to persist in its flow across the desert—this is the Río Loa; where the Loa emerges from the Western Cordillera the only large oasis settlement between Arica and Copiapó is established, the oasis of Calama (Map 39). Immediately downstream from Calama the Río Loa enters a deep and narrow canyon from which it emerges to enter the Pacific. In this canyon the water is not available for the support of oasis settlement. Even the mouth of the Loa is not used as the site of a port, for the gap through the Coastal Range is too narrow to serve as a route to the interior. The first surface water to reach the ocean south of the Loa is the Río Copiapó; and the oasis of Copiapó, a ribbon of cultivation almost ninety miles long, is generally regarded as marking the southern limit of the Atacama.

Except for the Río Loa, therefore, the Atacama is without surface streams. The valleys descending from the Western Cordillera have surface water at irregular intervals, although many of them remain permanently dry. A sheet of water, however, is constantly seeping down through the gravel fill in these Andean ravines, and out into the alluvial fans. Wells in the gravel within the mountain valleys can tap a small but fairly dependable supply of water; but the alluvial fans beyond the mountain front act like sponges permitting the water to sink to such depths that it is beyond the reach of ordinary wells. There are parts of the bolsons far to the west where the water table lies not far from the surface again—in one or two spots even close enough to be within reach of plant roots.

The Atacama as a Region of Transit

During the long history of Indian and Spanish settlement in this region down to the second quarter of the nineteenth century the Atacama remained a region of sparse population, playing the part of a barrier with no intrinsic value. The Indians of the Inca Empire wished to cross it from north to south because it separated the centers of settlement in the highland basins of Cuzco and Titicaca from the frontier region of Middle Chile. The Spaniards wished to cross it from east to west because it lay between the mines of high Bolivia and the nearest navigable water. Each arrived at a workable arrangement of routes of travel which made possible the crossing of this inhospitable region with a minimum of hardship.

The Indians established a road leading from north to south through Calama and Copiapó and on into Middle Chile. To cross the desert region between the main oases, however, required numerous smaller supply stations where food, water, and shelter could be provided. The little valley oases of the Western Cordillera served this function. The small communities supported by the oases varied in size from only one family to several hundred persons, according to the amount of water available. In their mountain valleys they were sheltered from the winds and dust of the desert—minute habitable spots in a barren land which were so well hidden that in some cases lighthouses were built on near-by ridges to guide travelers to them (89).

The Spanish conquest shifted the emphasis from north-south communications along the Andean front to east-west lines of travel. The Spaniards soon recognized the importance of the Indian settlement at Calama, and made it a major focus of communications—like Tacna and Arequipa to the north. Whereas Arequipa found its one outlet through Mollendo, and Tacna its outlet through Arica, Calama established its connections with the Pacific at several places in turn. At first the chief port was Cobija; later Mejillones and Antofagasta shared the trade of Calama. But none of these ports was easily reached; no one of them possessed outstanding advantages over the others. When travel from the interior passed through Calama and down to the little ports on the Pacific, the old piedmont oasis settlements of the Indians lost their function as supply stations and, supporting their small populations in complete isolation, they were forgotten by the world outside.

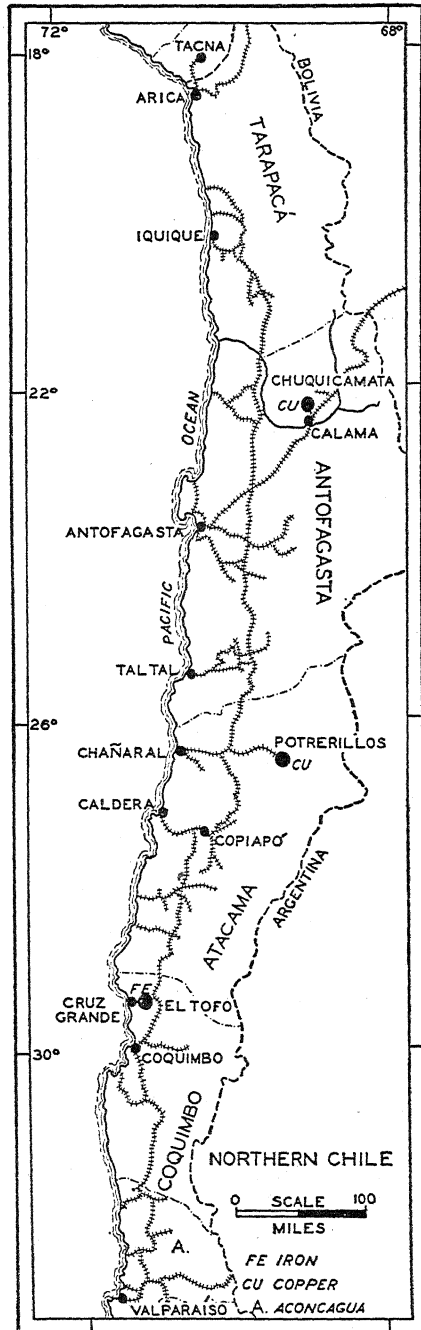
When the Wars of Independence established the national existence of Peru, Bolivia, and Chile, the political boundaries in this region were not carefully defined. The important oases came definitely under one or the other of these countries, but the exact marking of the boundaries in the uninhabited country between was not a matter of concern. Tacna was definitely Peruvian; Calama belonged to Bolivia; and the oasis of Copiapó was in Chile.

Rise of the Nitrate Industry

While the main problem in the Atacama until early in the nineteenth century was the maintenance of a route of travel across it, there were some attempts to explore the desert for minerals. Prospectors entered the region from Tacna and from Copiapó, and the first discoveries were of sources of silver and copper. Between 1832 and 1845 silver mining in

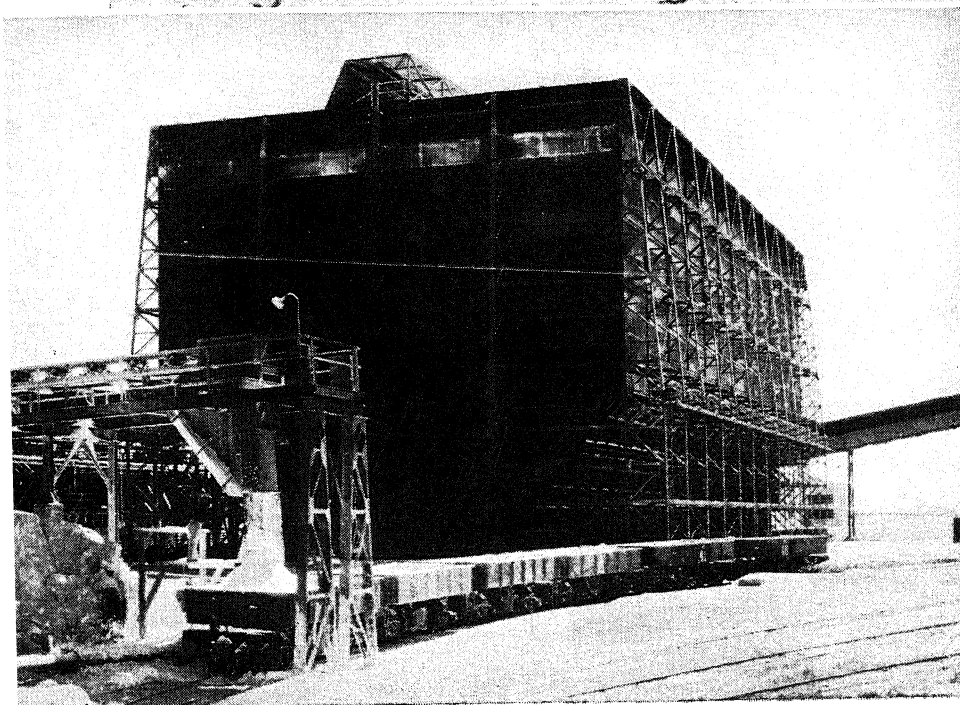
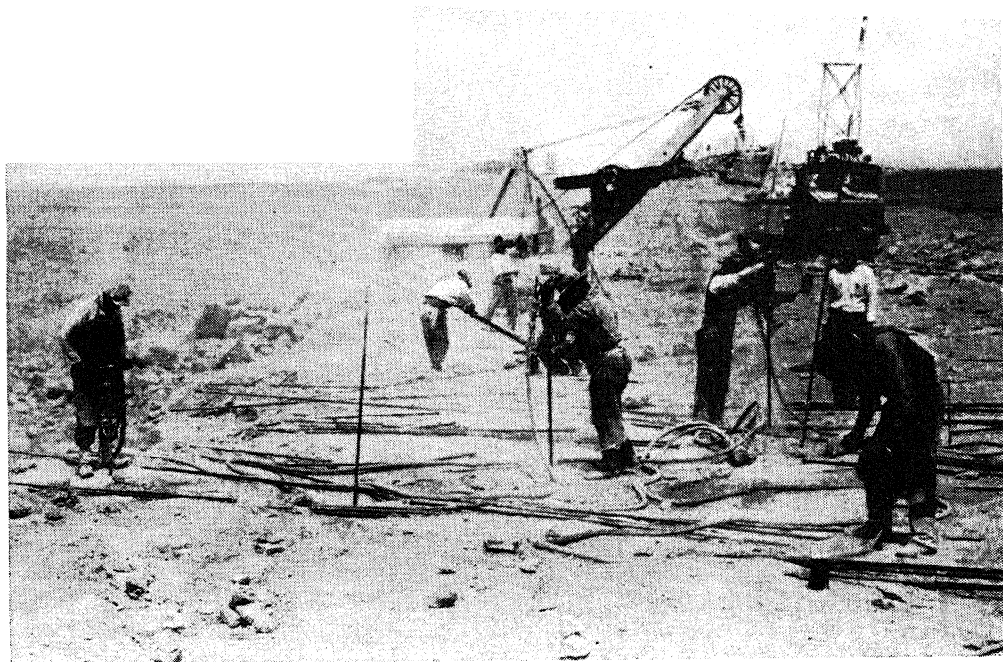
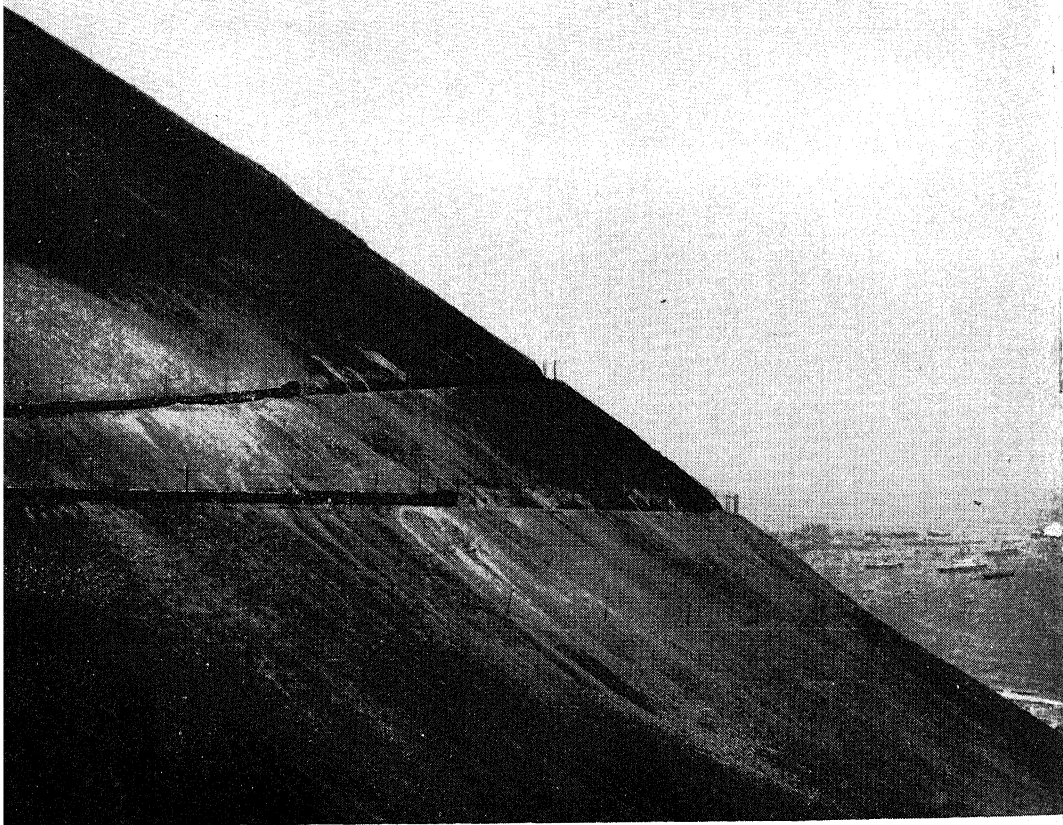
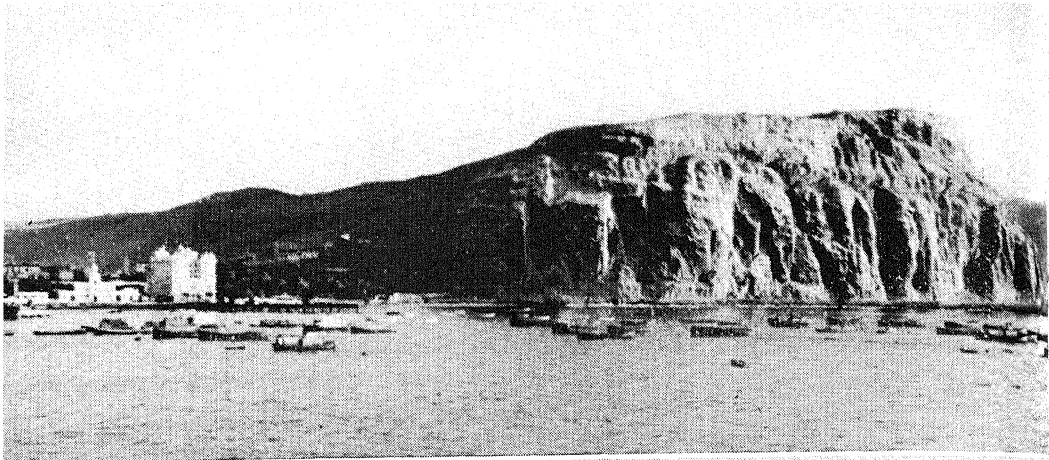
the vicinity of Copiapó resulted in the concentration of so many people in that oasis that they could not all be fed—a situation which was noted by Charles Darwin when he visited the place on his voyage around the world. Even as late as 1880, the development of silver mines in the country back of Taltal led to the establishment of that port. Copper, too, was found and mined, especially in the Western Cordillera, but copper mining was of little importance except during the years between 1850 and 1875. The two large copper mines which have survived to the modern period are Chuquicamata, near Calama, and Potrerillos, ninety miles inland from Chañaral.

MAP 40

The prospectors who found silver and copper in the mountains bordering the desert also learned of the presence of sodium nitrate. But sodium nitrate was only a curiosity until some one found a use for it, and not until the 19th century were uses discovered. Then, as the market for this salt developed, the fact became known that nowhere else in the world did sodium nitrate occur in sufficient quantities to be exploited in competition with the Chilean deposits. For a time the Atacama was the scene of a mad scramble for speculative profits. This era, however, was

suddenly brought to a close by the invention of a process for extracting nitrate from the air and by the subsidization of atmospheric nitrate plants by the "great powers"; these plants could produce nitrate in competition even with the less costly natural nitrate of Chile.

In the long run the most important use of nitrate is as a fertilizer. In recent decades Chilean nitrate has been used to enrich the impoverished soils of such places as the North American cotton belt, certain soils of low natural fertility in Europe, and the much overworked alluvium of Egypt. The first suggestion that the Chilean deposits might be used as fertilizer is credited to a German in 1809. In 1831 it is recorded that 110 tons were sent to England and were quickly sold there. By 1860 a thriving business had been established in the Atacama. With an abundance of reserves at hand and no competing sources of natural nitrate elsewhere an almost unlimited future in the fertilizer market seemed to lie ahead. Exports by 1860 had passed 50,000 tons a year.

The scramble for quick profits from the nitrate industry of the Atacama, however, is associated with the use of sodium nitrate in the manufacture of explosives. As long as black powder was in use, sodium nitrate was of little value because it has the property of absorbing moisture from the air and going into solution. But after 1860 the technique of making smokeless powder from nitroglycerine was invented, and sodium nitrate could be used in the manufacture of nitroglycerine. By 1895 exports from Chile had gone well beyond a million tons a year.

But the nitrate industry of Northern Chile was established under adverse natural conditions. The nitrate fields lie in the bolsons east of the Coastal Range in five distinct areas between Pisagua in the north and Taltal in the south (Map 38). The labor of digging up the caliche from the desert floor, moving it to the refineries, carrying through the refining process, and transporting the nitrate and its by-product, iodine, to the coast required the services of many workers. And these workers had to be brought to an area where there was no water, no vegetation, no other means of building or maintaining settlement than the import of supplies from outside. Even water had to be piped for hundreds of miles from the Western Cordillera, or even brought to the mining communities in tank cars. Profitable production under such conditions could last only as long as the nitrate exports continued to pay the costs of maintaining the workers in the desert. When, early in 1914, speculative overproduction of nitrate brought such financial difficulties that the whole economic structure of the industry was threatened, thousands of people had to flee from the region which offered no other means of sup-

The cheerless character of the Atacama region can be sensed in the picture above: no vegetation, no water. Here men are drilling, preparing to blast out the layer of sodium nitrate that underlies the surface. The electric shovel will load the ore into cars for transport to the refineries. Below is a plant where molten nitrate is forced under pressure through nozzles and changed into granulated form. The pure nitrate seen in the foreground will be put into bags and carried to the coast, thence to be shipped for use abroad as fertilizer or in the manufac- ... of the Chilean Nitrate Educa-

Above is the port of Arica, long the subject of rival claims by Peru and Chile. Now it is a Chilean port, and one of the chief outlets for Bolivia. The *morro* at the right was the scene of a great battle during the War of the Pacific. Below is the coastal range inland from the nitrate port of Tocopilla (Map 38). The picture shows vividly the difficulties that had to be surmounted in building a railroad across the mountains to reach this port. Both here and at the port of

porting life. Then came the First World War, and exports rose to peaks of more than 3,000,000 tons a year; workers streamed back into the Atacama, and the conquest was carried on with renewed confidence. At this time about 65,000 workers were employed in the nitrate operations; the whole region, including its ports, had a population of 270,000.

Political Changes in the Atacama

Meanwhile the political control of this region had been rearranged. Even before 1860 the vague boundaries in the Atacama had caused disputes over questions of jurisdiction, and temporary definitions of the boundaries were from time to time worked out. The development of the industry was being carried forward chiefly by Peruvians and Chileans. In 1879 about 59 per cent of the capital invested in nitrate was Peruvian, about 19 per cent was Chilean, 14 per cent British, and 8 per cent German (25). Although some of the richest fields were in Bolivian territory, the Bolivians had invested little capital in the new industry, and had sent few laborers to this remote part of their country. They did, however, wish to tax the new source of wealth; and quite naturally the Chilean companies operating in Bolivian territory felt that the taxation was excessive. Then the Peruvian government, in 1876, finding itself in serious financial difficulties, sought to reëstablish its finances by expropriating the privately owned nitrate plants within Peruvian territory and attempting to run the industry as a government monopoly. In the midst of growing confusion the Chileans landed troops at Antofagasta, declaring war on both Bolivia and Peru.

The War of the Pacific lasted from 1879 to 1883. Chile was victorious, and its military forces even occupied Lima. The Treaty of Ancon (1884) resulted in the permanent transfer of ownership of the Peruvian section of the Atacama to Chile, reserving for later decision the fate of the oasis of Tacna and its port Arica. Bolivia was also deprived of its part of the Atacama and shut off from the sea. Chile, in complete control of the nitrate country, continued the development of the industry and collected the growing revenues, thereby offering the world the rare example in modern times of a war which paid for itself.

From 1884 to 1929 the question of the final disposal of Tacna and Arica remained unsolved. Tacna and Arica lie beyond the northernmost of the nitrate fields and possession of them was in no direct way related to the exploitation of minerals. Chile perhaps desired to protect the fields from this nearest base of possible attack; Bolivia, shut off at

Antofagasta, pressed claims for an outlet at Arica; and Peru, through much propaganda, claimed Tacna and Arica as sacred territory which had been occupied by a conqueror. After many attempts at settlement the territory was finally divided between Peru and Chile (90). Tacna was awarded to Peru, Arica to Chile, and Bolivia was given the right of free entry through Arica and the use of the railroad from that port to La Paz.

Decline of the Nitrate Industry in the Atacama

During this period of controversy the exports of nitrate were bringing wealth to Chile. About a third of the selling price—which Chile could dictate since the Atacama was then the only important source of this mineral—was made up of the export tax. Into the Chilean treasury was pouring a golden stream, amounting to between thirty and thirty-five million dollars a year. Foreign capital was invested in the area in increasing amounts: by 1901 the British investments represented 55 per cent of the total; 15 per cent was Chilean; 14 per cent was German; and 10 per cent was Spanish. Most of the workers, however, were Chileans.

The First World War, as we have seen, saved the industry from the results of its first great period of speculative overdevelopment; but the war also laid the groundwork for the series of misfortunes which have since beset Chile. Synthetic nitrate, as pure as anything Chile could offer, was produced from the abundant nitrogen of the atmosphere by a process involving the use of electric power. The process was invented before 1914, and during the First World War the isolation of Germany from Chile hastened the perfection of the process. Under conditions of reasonably free trade the synthetic process could not compete with natural nitrate. Only a substantial subsidy can make such plants economically possible, but subsidy has been the order of the day as the various nations of the Northern Hemisphere have sought to make themselves as independent as possible of their neighbor's resources. In 1926–27 as much as 80 per cent of the world's supply of nitrates was synthetic. In 1932 there were 83 nitrate-producing plants in the world—located in Germany, the United States, France, Japan, Belgium, Holland, Great Britain, and Italy—with a combined capacity of about 3,500,000 tons. Chile's exports had dropped to 617,000 tons in 1931; and a year later, in the depth of the depression, they dropped to 60,000 tons, which represented only 4.7 per cent of the world production of that year. Since then the Chilean production, under international agreements, has increased again (1938 production was 1,420,312 tons).

In the modern era the refineries of the Atacama are not running anywhere near their capacity. In 1926 a huge new plant was built with North American capital to make use of a new refining process which makes possible the utilization of low grade deposits. The capacity of this plant alone is estimated at 4,000,000 tons a year. In a world of relatively unobstructed international trade the cost of nitrate from Chile would be so low that the Chilean industry could easily compete with the atmospheric nitrate plants. But the world nitrate market is no longer an open one, for the war-frightened peoples of the world are willing to pay higher prices for their fertilizer in order to maintain their own sources of the raw materials for explosives. The population of the Atacama fluctuates with the increases and decreases of the Chilean production. In 1937 there were about 29,000 workers employed, as compared with a little over 25,000 in 1936.

The story of iodine, a by-product of the refining process of nitrate, is similar to the story of the parent industry. For a time Chile was the major source of iodine, but in 1927 iodine was found in the water associated with petroleum in the wells of Southern California. Since that time the whole iodine market of the United States has been closed to the Chilean product.

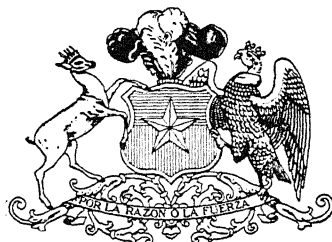
The "Conquest" of the Atacama

During all these chaotic developments which involved war, transfer of national territory, a spectacular rise of prosperity and an equally spectacular collapse, the Indian villages along the Andean piedmont have remained undisturbed. Each community, nestled in its little valley, is essentially an independent unit, producing little for export, and buying little from the outside. Water is still the primary need, and the population of each oasis is closely adjusted to the amount available. Some of the larger oases, perhaps with five hundred inhabitants, have built reservoirs and aqueducts to increase the supply and insure the regularity of water, but many smaller oases depend solely on wells sunk in the gravel of the valley bottoms. Near the villages the valley sides are terraced and irrigated, and on these fields maize is raised for human food, and alfalfa for the sheep, llamas, and goats. The food supply consists of maize, meat, goat's milk, and cheese. The women make pottery and spin and weave the wool for clothing. Rarely an itinerant trader with his goods on the back of a mule comes to town to sell the products of the outside world.

The inhabitants of the piedmont towns have other means of support in a few activities outside the immediate village locality. They own herds of sheep, llamas, and goats which they pasture during a part of the year on the scanty grasses of the higher Andes. In years of unusually heavy rainfall in the high mountains the pasturage may be so abundant that animals are actually imported from a distance—in one case driven over the mountains from the plains of Argentina. But such periods only come once or twice in a lifetime.

Which one of these contrasted kinds of settlement represents a conquest of the desert? Surely not the nitrate settlements. Only the unchanging "out-of-the-world" communities of Indians have formed a connection with the resources of the land which has proved to be permanently workable. The nitrate settlements and the ports which serve them can exist only so long as nitrate brings a good price in a precarious market. It is only a question of time before the nitrate works will be abandoned, whether this event is determined by the final victory of the synthetic process in a free market or by the exhaustion of the supplies of sodium nitrate in Atacama. Only Arica, Antofagasta, and Chañaral tap other hinterlands than those of the nitrate fields. The other ports will be evacuated; the pipelines, railroads, and refineries will rest as picturesque ruins in the desert—curiosities of an ancient time. The nitrate workers will seek a living elsewhere. But these changes will pass almost unnoticed by the Indians in the piedmont oases.

8

REPÚBLICA DE CHILE

Total area, 286,396 square miles

Total population, 4,677,089

Capital city, Santiago; population, 829,830

Trade per capita:

Imports: $22.56
Exports: $30.30

Unit of currency, peso ($.206, gold content value)

Major commercial products in order of value:

copper	barley
nitrate and iodine	beans
wool	hides and skins
lentils	meats
iron ore	oats

Railroad mileage, 5,444

(The above statistics are for the year 1938.)

8

CHILE

THE POPULATION of Chile is clustered in one central region, and in a very real sense this one region is Chile (Map 1). The national territory of this remarkable country stretches for 2,630 miles from nearly 56° S., where Cape Horn points toward the Antarctic Continent, almost to 18° S., at Arica; yet at no place is the eastern border of Chile as much as 250 miles from the sea. Southern Chile is one of the rainiest parts of South America, where glaciers descend from snow-covered mountains to a deeply fiorded coast: Northern Chile is one of the driest places on earth; in it is one of the few weather stations where no rain has ever been recorded. Yet these two ends are Chilean only in the sense of possession. The real Chile is the beautiful land between: a land which forms a narrow strip between high mountains and the sea; a land covered with fields of growing crops and green pastures, bordered by graceful rows of Lombardy poplars, eucalyptus, or weeping willows; a land of dense population.

The geographical unity of Chile's one central cluster of people gave this country a distinct advantage in the development of a coherent society. This advantage, moreover, was supported by a racial homogeneity which is greater than that of any other west coast country. To be sure, the usual social distinction appeared between the small minority of landowning aristocrats and the large majority of landless tenants; but this social gap was bridged in Chile by the strongly paternalistic character of the system. More than elsewhere on the west coast, the

landowners lived on their estates and took a very definite part in the life of the rural communities. In this respect, the development of Chile has been notably different from that of the countries to the north where the landowners usually reside in the cities.

The rural population of the northern part of Middle Chile has exhibited a marked capacity to expand. Here we find the second example (the first example was in Antioquia in Colombia) of a society in which the rate of growth is sufficient to permit an expansion of the frontiers of settlement without a decrease of the density in the nucleus. One of the salient facts about the population of Chile is that the present densities of rural settlement in the central region were reached before 1870; and since that time, while the total number of Chileans has doubled, the increase has been absorbed in a number of ways—partly by the pioneer colonization of the previously little occupied lands which lie south of the Río Bío-Bío in Southern Middle Chile.

The established order of society in rural Chile has now been challenged. None of the countries we have already described has experienced so strong a penetration of the industrial way of living as Chile. Rural Chile is still a land of large estates, of landed aristocrats and landless tenants. But now an urban Chile has appeared—industrial cities with wageworkers and owners of capital. Today Chile makes use of more energy per capita—as supplied by water power, coal, and oil—than any other Latin-American country. Against a background of large estates, on which the farm practices are still for the most part primitive and on which life is lived as in an earlier century, there are rapidly growing industrial cities, such as Santiago, Valparaiso, Concepción, and Valdivia. Industrial society brings new diversity into the Chilean scene; people who work for wages and people whose prestige is based on financial success have developed attitudes and objectives which are utterly foreign to those of the people in the rural communities around them. But the traveler who has seen only the cities, and who has passed through the country only on a modern electric train, does not really know Chile.

THE CHILEAN PEOPLE

Chile is a mestizo country. Its population includes none of the profound racial diversities found in the lands farther north. Only about 5 per cent are pure-blooded Indians. The number of Europeans whose ancestry remains unmixed is estimated at between 20 and 30 per cent. The remainder, 65 to 75 per cent, are mixtures of Indian and Spanish in

ıs degrees. This mestizo group is nearer the Spanish side of the ıre than are the mestizo groups of Peru, Bolivia, and Ecuador. It d that in the more prominent families of Chile there have been no n ancestors for six or seven generations.[1]

ndians of Chile

e Chilean Indians were not at all like the Quechua and the Aymara ɔs which had been dominated by Inca rule. It has been estimated ıt the time of the Spanish conquest there were some 500,000 natives : middle part of Chile, roughly between the modern Valparaiso and o Montt. In the forests south of the Río Bío-Bío, the warlike :anians had held the Incas at bay, using the woods to good advan-in fighting armies whose only previous experience had been in open try (Map 4). The Araucanians had achieved a culture level not e that of the Iroquois of North America: they were hunters and 's, but they derived a large part of their food supply from a shifting 'ation of maize.

e Araucanian tribes inhabiting the more open country north of the 3ío-Bío were brought under the influence of the Incas. The latter :eded in pushing their conquest as far south as the Río Maule ɔ 41), but since the road to Cuzco was long and difficult, the hold ıis remote frontier was weak. Just inland from Valparaiso lies a ı, watered by the Río Aconcagua, to which the Incas gave the name : of Chile," and in which they established their southernmost :ment. South of the Vale of Chile, in the vicinity of the present of Santiago, the Araucanian tribes had been taught, or had, them-s, learned, how to build simple irrigation ditches and how to raise ; year after year on the same land. Thus fixed in position, they ed a kind of "march" to protect the Inca settlements farther north the attacks of the still warlike and seminomadic tribes from the ıern forests. These sedentary Araucanians, rather than the more itive tribes farther south, made the largest contribution to the racial ɔosition of the Chilean mestizo. But Inca rule, even in the Vale of :, was not able to wipe out the strong sense of independence and 'idual initiative which still distinguishes the descendants of the canians from the descendants of the Andean Indians.

.uis Thayer Ojeda, *Elementos étnicos que han intervenido en la población de* Santiago, 1919, p. 77.

The Spanish Conquest and Race Mixture

The first Spanish explorers to penetrate the really formidable barriers that isolated Middle Chile were moved by the same desires as those which led Pizarro to his conquest of Peru. But Chile had little to offer. Its stream gravels contained little gold; and its Indians were much less docile than those of Peru. When Pedro de Valdivia tried to organize an expedition he found few volunteers ready to face the hardships of the overland march to a land of reported poverty. Nevertheless, with a small army he reached Middle Chile and founded the city of Santiago in 1541, and the city of Concepción in 1550. Almost at once the newcomers were involved in war with the Araucanians—a war which continued with few interruptions until the second half of the nineteenth century. In spite of the absence of precious metals and the warlike character of the Indians, the Spaniards were drawn to Middle Chile because of the productivity of its soils and because of its attractive climate. In many respects this new land reminded the Spaniards of Andalucía, the province of southern Spain from which most of them had come. The surface of Middle Chile was soon marked off in big agricultural or pastoral estates the ownership of which created a new aristocracy. Those who desired wealth in the form of gold went elsewhere.

The Spaniards who first came to Chile seem, like the Indians, to have been different from those who established themselves in other parts of Spanish America. During the first two centuries most of the invaders came from the south of Spain, from those provinces in which the Moorish influence had been present longest and was most penetrating. After the beginning of the eighteenth century, however, Chile began to attract more and more people from the northern part of Spain, and these, according to the Chilean writer Luis Thayer Ojeda,[2] were a very different type from the restless, adventure-loving southerners.

Race mixture was as free and as little accompanied by prejudice in Middle Chile as in other parts of Latin America. There were few white women in Chile during the early years of the Spanish conquest, and each soldier was soon attended by several native women. It is said that there were four women to every man in the frontier posts established to protect the settlements against Araucanian raids; in one week during the year 1580 sixty children were born at a post where 160 men were stationed. The territory was soon swarming with mestizo children produced by the mating of two exceedingly virile and warlike racial types—the best of the

[2] *Op. cit.*, p. 59.

Spanish soldiers, selected for bravery and endurance because of the difficulty of reaching Chile, and the women they had captured from the indomitable natives.

Social differences soon began to appear in this new society. The contrast between the owners of land and those who did not own land was becoming greater and greater, in spite of the fact that no racial differences separated these two classes. Among the mestizo children, the girls had the better chance to marry well; the boys usually were less fortunate. Indian and Spanish blood, however, mixed freely whether among the landowning aristocracy or among the tenants who were becoming more and more closely attached to the big estates.

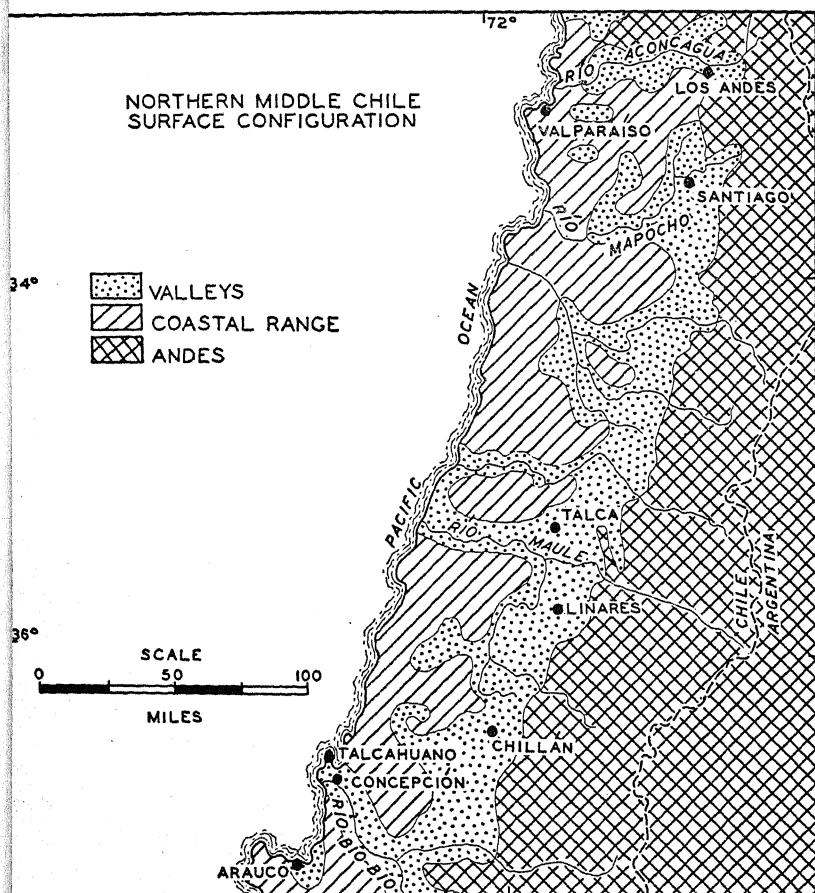
Out of this mixture has come a new racial type; the Chilean mestizo, who is a far more virile and energetic person than the mestizo produced by the mating of Spanish and Quechua. The Chilean laborer, whether in the city or the country, is noted for physical strength, endurance, bravery, loyalty, and a spirit of independence. To what extent these qualities are the result of a more invigorating climate, or of a better diet, or of superior racial inheritance contributed both by the Indian and Spanish elements, cannot at the present time be estimated. It is more than likely that all these things have contributed to the peculiar qualities of the Chilean people.

Concentration of People in Middle Chile

The result of four centuries of Spanish control in Chile has been the notable concentration of people of this type in the region which may be termed "the cradle of Chilean nationality." In the original Vale of Chile, and in the Central Valley between Santiago and Concepción, a relatively dense rural population was gradually built up. Most of the central part of this district has a density of over 125 people per square mile, and one section near Santiago has a rural population of 448 people per square mile (Map 43).

The people of this area have a very high birth rate. The rate of 34 per thousand is one of the highest in South America; it is exceeded only by that of the amazing group of pure European people who are concentrated in the district of Antioquia in Colombia. A very high rate of infant mortality, however, somewhat lowers the net increase.

Outside of Middle Chile there are very few people. Some 90 per cent of the citizens of Chile live in its core area, providing one of the clearest examples in South America of concentration of people in a single nucleus

om over seven thousand feet in altitude in the north, to one or two housand feet in the vicinity of Concepción. The range rises abruptly om the shore of the Pacific with a series of elevated marine terraces on s lower slopes. Along the coast in Northern Middle Chile, as in Northern Chile, there are few harbors except where promontories give

Map 41

partial protection from the prevailing southerly winds, as at Valparaiso, Talcahuano (the port for Concepción), and Arauco.

Between the Andes and the Coastal Range there is a structural depression of varying width known as the Central Valley of Chile. The streams which descend from the Andes cross this depression more or less at right angles, and plunge through canyons in the Coastal Range to reach the sea. Only along a few of the rivers, such as the Maule and the Bío-Bío,

do broad, flat-floored valleys extend all the way to the Pacific. The Central Valley is divided by spurs of the Andes into separate basins, in some cases completely separated from the basins to the north and the south. Between Santiago and Concepción, these basins are continuous; along the Bío-Bío the Central Valley is between thirty and fifty miles wide. The Vale of Chile, along the Río Aconcagua, is isolated by a mountain spur from the valley of the Río Mapocho, in which Santiago is located, and this spur requires a climb to about 2,600 feet in crossing from one basin to the other. Between the Vale of Chile and the beginning of the desert at Coquimbo the Andes and the Coastal Range are so close together that the basins of the Central Valley are pinched out.

The floors of the basins which form the Central Valley are not level. The Andean streams have built great alluvial fans sloping from east to west. The elevation of the Central Valley near Santiago varies from 2,300 feet along the mountain front, to 1,100 feet where the Mapocho enters the Coastal Range. Santiago itself is at an elevation of 1,700 feet above the sea. The Central Valley along the Río Bío-Bío is much lower, sloping from about 900 feet to about 300 feet.

Climate and Vegetation

The most distinctive feature of Northern Middle Chile is the climate. Between Coquimbo at latitude 30° S. and Concepción south of latitude 36° S. there is a transition between the desert of the north and the continuously rainy lands to the south. This is a climate of mild, wet winters and cool, dry summers, to which the name "Mediterranean" is commonly applied. A similar type of climate is found on the west coasts of all the continents between 30° and 40° of latitude.

The temperatures are within the range which is considered to be the optimum for human comfort and energy. At Valparaiso the coldest months (June and July) average 52.3°, whereas the warmest month (January) averages 63.7°—temperatures which are a little lower than those of San Diego in California. In the Central Valley, where protection from the chilling effect of the cool sea is just about compensated by increased elevation, the averages are similar to those of the coast, only the extremes are somewhat greater. Temperatures at Santiago average 45.7° in the coldest month, and 68.7° in the warmest month. Freezing weather is sometimes experienced in the Central Valley, but snow is a rare occurrence.

Rainfall increases steadily from the desert margin toward the south. The length of the summer dry season becomes shorter and shorter until, south of the latitude of Concepción, there is no season which is essentially rainless.[3] Throughout Northern Middle Chile, however, the summer is either entirely dry, or receives an average of less than half an inch in the driest month. The total annual rainfall is only 4.5 inches at Coquimbo; it is 9.0 inches at Los Andes in the Vale of Chile; it is 13.8 inches at Santiago; and it is 30.1 inches near Concepción. South of Concepción the rainfall increases rapidly (Map 9).

The winter rains of this region are produced, as in other mediterranean regions of the world, by the interaction of cold and warm air masses, known to meteorologists as cyclonic storms.[4] The normal air movement over Middle Chile in both summer and winter is from the southwest; it is produced by air circulating around the permanent center of high pressure at about latitude 30° S. in the South Pacific. Throughout the year this stream of relatively warm, humid, and light air is penetrated at intervals by masses of heavy, cold air from the Polar Pacific Region. As a cold air mass advances northward, the lighter oceanic air forms a whirl along its front, a whirl which circulates in a clockwise direction. The cold air masses and the whirls they set up pass at close intervals throughout the year across Southern Chile and the southern part of Middle Chile; but in winter some of the cold masses are strong enough to move northward along the Chilean coast beyond Concepción. The whirl along one of these advancing fronts brings strong winds from the northwest and north; and these are replaced by a sudden shift to southerly winds as the cold front passes by. The advancing cold air, being relatively heavy, forces the whirling air ahead of it to rise, and this rise brings rain. The approach of a cold air mass, therefore, is heralded by a shift of the wind from the usual southwesterly direction to the northwest and north. Since the cyclonic whirls sometimes, in winter, develop considerable velocities, and since the storm winds come from a northerly direction, the Chilean harbors, protected from the south but open to the north, are peculiarly dangerous for ships caught in them at such times. Because these cold air masses never push beyond Concepción in summer,

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[3] On Map 10 the Csb climate is the "mediterranean" type, with mild wet winters and dry cool summers; the Cfbs climate has no dry season, although more rain falls in winter than in summer; the B climates are arid or semiarid.

[4] The term *cyclone* should not be confused with the popular word cyclone which refers to a tornado. A meteorologist uses this word to refer to any whirling storm. In most parts of the middle latitudes of the world the alternation of warm and cold air masses is associated with the passage of cyclones.

this season in Northern Middle Chile remains very dry; and because only the strongest winter storms push far into the region north of Concepción, the rainfall brought at this season decreases toward the north.

The intermediate zone between the land which is seldom rainy and the land which is seldom dry is covered by a distinctive type of vegetation—mediterranean evergreen broadleaf forest consisting of a scattered growth of scrubby trees which retain their leaves throughout the year. The first patches of this type of forest appear on the slopes of the Coastal Range a little south of Coquimbo, and the forest becomes denser and more extensive toward the south. Throughout the region, however, there are many areas where the forest is replaced by a growth of low evergreen bushes, of a type remarkably similar in appearance to the *maquis* of southern Europe and to the *chaparral* of California. This typical mediterranean vegetation ends abruptly along the Río Bío-Bío (Map 7).

The Chilean Hacienda

Such, then, are the distinctive qualities, qualities of both land and people, which set this nucleus of the Chilean state apart as unique in all Latin America. The basic institutions of Chile, evolved under these conditions, have inevitably taken on a stamp of strong individuality. And no institution is more fundamental to an understanding of the present-day population of Chile and its relation to the land than is the Chilean hacienda. This form of land tenure had its beginnings and its development as a result of the importation from Spain of the traditional ideas of a feudal society; but the result in Chile differs in a number of important ways from the hacienda as it has developed elsewhere in Spanish America.

As in other regions newly conquered by Spain, one of the first acts of the Spanish crown was to reward the officers of the army by the granting of encomiendas. These were not grants of land, but only grants of the right to collect tribute from certain Indian communities. Where the desire to own land was so strong a motivating force, however, the ownership of an encomienda could not long satisfy. Outright grants of land were therefore sought from the Crown or from its appointed representatives.

Direct grants of land varied in size according to the position and merit of the person to whom the grant was made. There were town lots for those who wished to live in the chief centers; there were small farms for the soldiers of lower rank; and there were vast estates measured in square leagues for the officers of higher rank. Before many decades, therefore,

the Chilean territory had been partitioned among a relatively small proportion of the Spaniards. The small farms predominated only on the outskirts of the towns and near the Araucanian border along the Bío-Bío: the prevailing form of rural property was the hacienda—the estate of vast size. The owners of the haciendas assumed their places, in accordance with the tradition of feudal society, as the leaders of the political, economic, and social life.

Pattern of Rural Properties

Large estates have persisted to the present time. In spite of the relatively high density of population in the Central Valley of Chile, the land is still marked off in big units. McBride's description illustrates clearly the peculiar qualities of the Chilean rural landscape:

> As one travels through this part of the country one is impressed with the large scale of the agricultural patterns: league-long rows of eucalyptus and Lombardy poplar trees stretching across the landscape; high, well-built mud walls lining the road for miles without a break; irrigation canals (*acequias*) following these walls in a single extensive system; dozens of connected fields, not large in themselves, but joined by gates showing that they are all sections of the same property; the absence of houses in most of the fields; private roads uniting the fields with an extensive central settlement perhaps several miles away; a great rambling hacienda house set in an attractive grove of giant eucalyptus trees, surrounded by beautiful mediterranean gardens, and separated from other houses of its type by leagues of agricultural land; back of the house, covering a distance of several city blocks, granaries, storerooms, wine *bodegas*, workshops, implement sheds, dairy barns, sometimes a silo or two, stables for saddle horses, and stock corrals; and not far away numerous small dwellings of laborers, strung along both sides of the main hacienda road like a village with a single street—a town of workers and their families all connected with the farm. Such is the picture one carries away of the present-day agricultural landscape.[5]

Chilean statistics are detailed enough to give some idea of the size of the rural properties.[6] The figures for 1925 list 82,084 rural holdings in the provinces which lie between Coquimbo and the Río Bío-Bío. Of these properties, 76,588 are classified as small ones, since they are less than 200 hectares [7] in size. Only 5,396 properties, about 7 per cent of

[5] Quoted by permission of the American Geographical Society of New York, from G. M. McBride, reference 88, pp. 123–124.

[6] República de Chile, Annuario Estadístico, Vol. 7, Agricultura, 1925–1926. Quoted in McBride (88), pp. 124–125.

[7] One hectare equals 2.47 acres; 200 hectares equals 494 acres. There are 640 acres in a square mile. These "small farms" of only about 500 acres are much larger than those spoken of as small farms in the United States, or in the Old World mediterranean regions.

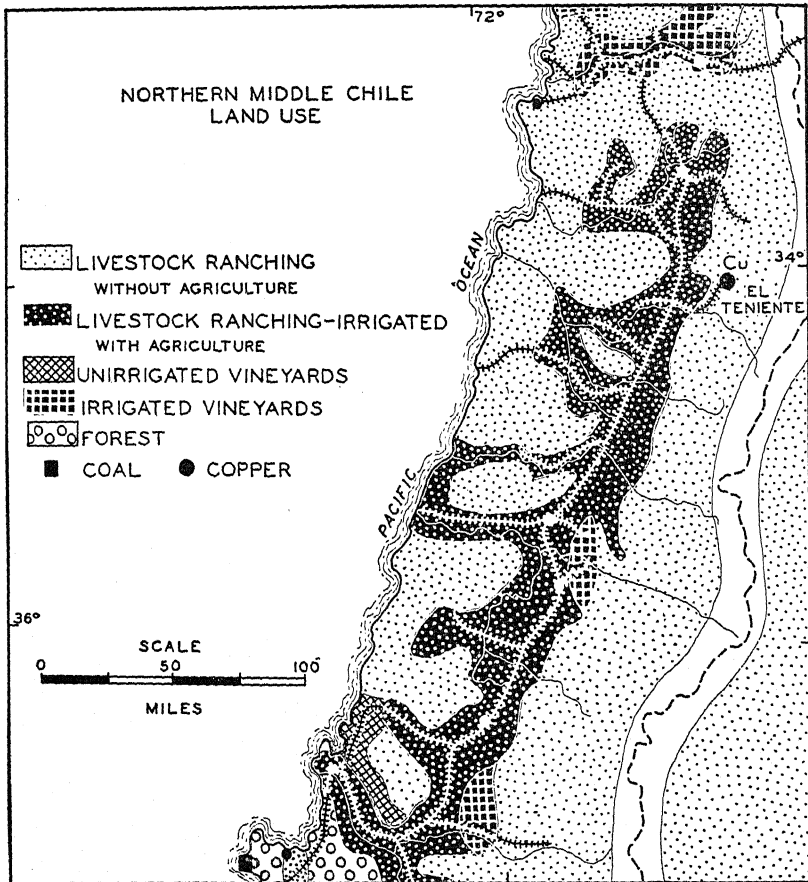
the total number, are classified as haciendas. But this relatively small proportion of the properties includes 89 per cent of the land in farms in Middle Chile. In the Vale of Chile, 98 per cent of the land in farms is included in 3 per cent of the properties.

Some of the haciendas are of vast size. The census lists 375 properties of more than 5,000 hectares—larger, that is, than 12,350 acres. This group makes up less than half of 1 per cent of all the rural properties, yet it includes 52 per cent of the privately owned land of Middle Chile. Most of the very large estates are in the vicinity of Santiago, or north of it. The largest estate is said to be the Hacienda Río Colorado, near Santiago, which has an area of 160,000 hectares, or about 618 square miles.

Only a small proportion of these large estates, however, consists of arable land. On the Hacienda Río Colorado, for example, only 250 hectares are irrigated, the remainder being too mountainous or too dry for the production of crops. In the territory which lies between Santiago and Concepción, only about 10 per cent of the area can be used for crops, and not all of this can be irrigated. Yet it is on this small part of the total national territory that the Chilean people are concentrated.

Irrigation and Land Use on the Haciendas

Considering the number of people who derive support from the farm lands of Northern Middle Chile, it is remarkable how primitive and inefficient the agricultural methods have remained. Irrigation, to be sure, is practiced on most of the cropland of the Central Valley, for the summer dry season makes it necessary to irrigate the annual crops, and in the drier north even the vineyards and orchards must be watered. Most of the irrigation systems have been built and are now maintained at the expense of the owners of the haciendas; there is no large public system, but only a series of private reservoirs and canals built to serve each separate estate. Because of the ideal natural conditions, irrigation development is not expensive. Many of the Chilean rivers rise in the permanent snow fields of the high Andes, and, as a result, the water supply is ample, even during the dry summer—so ample, in fact, that the Chileans have never had to apply those techniques of careful water conservation developed in some other irrigated regions of the world. Water distribution, too, is a simple matter, requiring little engineering skill, for the land slopes westward from the base of the Andes so gently, yet so uniformly, that ordinary gravity canals can be used. Even the Araucanians, perhaps with some tutoring from the Incas, were able to build irrigation canals.

There are few irrigated lands in the world with comparable densities of population dependent on them, however, in which such a small proportion of the area is devoted to food crops as in Middle Chile. About one field in ten is used in any one year for the cultivation of grains; the rest lie fallow, or are planted to alfalfa and grazed by small herds of cattle

MAP 42

and horses. The predominant use of the land is pastoral: either directly as pasture; or for such feed crops as alfalfa, oats, clover, and vetch. As far south as latitude 36° S., the animals are driven into the mountains every summer to graze on the high-altitude meadows between the tree line and the snow line. When winter comes the herds are brought back to the irrigated valleys to feed on the crops raised there during the summer—a characteristic form of mountain economy in the lower middle

latitudes of the Occidental world, known as transhumance. Annual cattle fairs at Santiago, Talca, and Chillán are of great importance as economic and also social events. The continued predominance of stock raising in spite of growing population is a reflection of the system of large properties and landless tenants.

Of the food crops raised in the Central Valley, wheat is of chief importance. Methods of cultivation and methods of preparing the grain are remarkably primitive, although here and there some of the hacienda owners are introducing machinery and modern techniques. Sowing is still done, generally, by the broadcast method; the ripened crops are cut with sickles and the sheaves are tied by hand; on many of the estates even now the threshing is done by the trampling of horses' feet. It is remarkable that under these conditions yields of from 25 to 30 bushels to the acre are the rule. Such productivity is the result of the exceptional fertility of the soil, a fertility which is renewed each year by the fine layer of mud brought down in the streams from the glaciers of the Andes. With more careful agricultural practices the yields might be extraordinarily large; yet in spite of the fact that Chile does not raise enough wheat for its own needs, the movement toward more intensive wheat production is slow.

Maize is distinctly not a mediterranean crop. It requires warm, moist summers; in a climate of winter rains and cool, dry summers, it yields poorly, even under irrigation. The native peoples of America, whose chief cereal was maize, never regarded the regions with mediterranean climate as lands of plenty; wheat was the crop which made the world's mediterranean lands so productive. Nevertheless, maize is still the chief food grain of the Chilean tenants. In addition to maize, they raise, on their small plots, potatoes, beans, peas, lentils, onions, artichokes, and peppers.

Very little of Northern Middle Chile has a form of land use which is characteristically mediterranean. Barley, which, along with wheat, is a common grain in the mediterranean regions of the world, is not lacking in Chile, but it is found mostly near the larger cities where it is used in the manufacture of beer. Olives do not thrive in Chile because of the absence of hot summers. Other mediterranean fruits, which might be grown in Chile, are actually found only in small areas. To be sure almost every hacienda has a little of its land devoted to vineyards and orchards, but only in a very few places are vineyards and orchards predominant. In the whole region only about 15,000 hectares are used for irrigated vineyards, and 30,000 hectares, mostly on the slopes of the

Coastal Range near Concepción, are used for unirrigated vineyards (Map 42). From these vineyards, however, wines of excellent quality are produced. Yet, in comparison with other mediterranean countries of the world, this one has yet to develop the usual intensive forms of land use.

The Inquilinos

The *inquilino*, or tenant worker, is the traditional victim of this agricultural system. The Chilean tenant, unlike the rural worker of countries like Bolivia and Peru, is not separated from the landed aristocracy by racial difference, for in racial make-up Chilean society is notably homogeneous. The Chilean tenant, also, is legally free to move about as he chooses. He is not a peon, for debt bondage is not recognized in Chile. Yet the fact remains that in few parts of Latin America is the tenant worker more closely bound to the land than in Middle Chile: he works on the land on which his ancestors have worked perhaps for centuries; he is conditioned from birth to regard the estate owner as his protector, his *patrón*. The landowner, who never undertakes manual labor even as a form of training for his position, is the manager, and the patriarch. He lives in a world apart: he is educated in Europe, he is widely traveled, he is familiar with the world's art and literature. The landowner would be ashamed to permit any of his inquilinos actually to starve, but no pressure of opinion forces him to raise their miserable standard of living above the bare necessities which tradition accords them. Although the inquilino is held to the estate on which he was born only by custom, he would find it difficult to leave were he to attempt to do so. The other haciendas would not accept him, and there is no unoccupied land in this part of Chile for him to claim by the time-honored method of squatting. Only the city would offer him a place.

The life of the Chilean inquilino contains few pleasures. He is given a house, usually built of mud, with a mud floor, and thatch roof. There is no provision for heating, and the cooking is done outside, even in winter. About two acres of land around the house may be used in any way the tenant desires, and is generally used for gardens; and each tenant is given a small plot of land some distance away on which he may raise his own supply of grain. Around his house there are usually a few animals—dogs, chickens, and one or two pigs. The furnishings of the house are meager: a few crude chairs, a chest of drawers, a trunk, an iron bedstead, and, usually, a sewing machine. There are no provisions for sanitation.

The water supply for all purposes is taken from an open irrigation ditch, common to the whole group and entirely unprotected from pollution. It is little wonder that of every thousand children born alive in Chile, 248 die within the first year. If the Chilean inquilino, on occasions, seeks the solace of the local vintages somewhat to excess, the remedy would seem to lie in a change of the system of which he is the traditional victim.

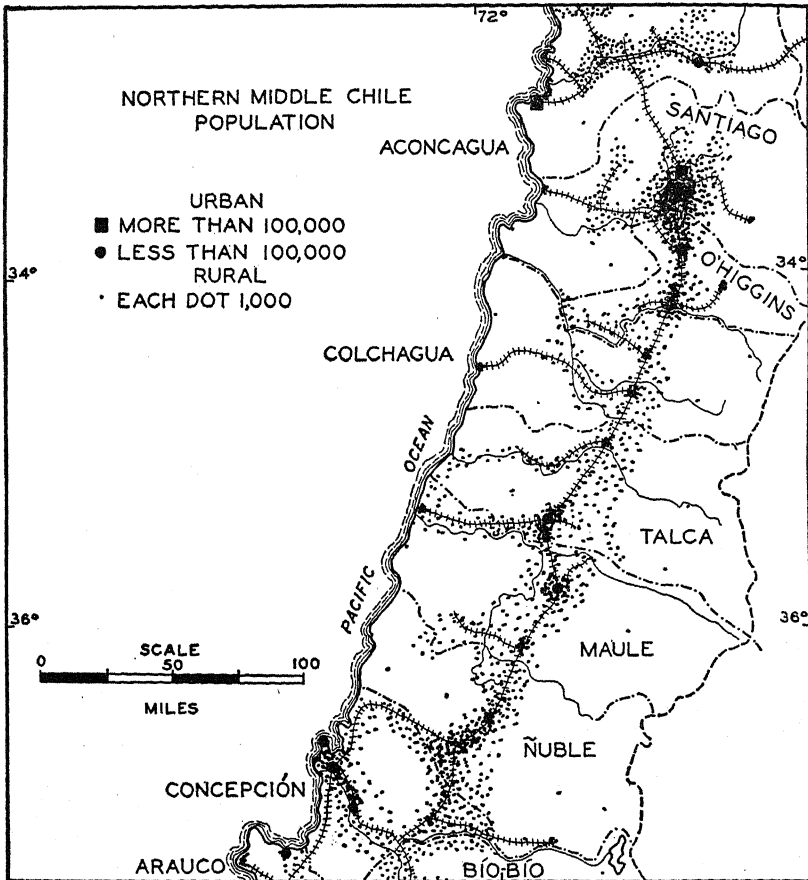
Small Properties

Land tenure in Chile has begun to show signs of change, however. One of these signs is the increase in the number of small properties—that is, of properties of less than two hundred hectares. Small properties have existed, along with the haciendas, since the first land grants of the colonial period, but now their number is increasing more and more rapidly. The small farms are now most numerous at a distance from Santiago, especially south of Talca; but there is one area of small properties in the Vale of Chile, near Los Andes, which is one of the few places where this form of land tenure is found on really first-class land. Small farms are numerous in the valleys of the Coastal Range, and in the Andes. Although the small independent farmers have been able to make a living only slightly better than that of the inquilinos, nevertheless they are exerting an increasing amount of political influence; their chief significance today is that they are symptomatic of changes yet to materialize.

Population of Northern Middle Chile

Haciendas and small properties, landlords and inquilinos have introduced diversity into Chilean society whereas the land and the racial composition of the people suggested unity. But in spite of this social and economic stratification, the cluster of people which makes up the nucleus of the Chilean state has shown a notable tendency to grow and expand. Furthermore, expansion has not been accompanied by a decline of the density of population in the original nucleus.

Since about 1860 or 1870 the density of the rural population of Northern Middle Chile has remained static. The number of people in the provinces between Coquimbo and Concepción, excluding the cities of Valparaiso and Santiago, was about 1,425,000 according to the census of 1885; in 1920 the same provinces had a population of 1,497,000; and in 1930, although changes of the provincial boundaries make exact compari-

son difficult,[8] the figure for the population of this same area was only about a million and a half. Yet during this period from 1885 to 1930 the total population of the country about doubled, and this increase has been supported only to a very minor degree by immigration.

Map 43

This brings us face to face with a question to which not only geographers, but also economists, sociologists, and many other students of human affairs would like to find an answer—the population capacity of land. This is a fundamental question in social science, perhaps one of the basic questions that must be answered before there can be any really

[8] William E. Rudolph, "The New Territorial Divisions of Chile . . .," *Geogr. Rev.*, Vol. 19, 1929: 61–77. Since 1930 most of these changes have been abandoned and the old provinces have been reëstablished (Map 43).

effective land planning. But the elements involved in determining the population capacity of land include so many to which no techniques of exact measurement can as yet be applied that the usual answers to problems of population capacity are at best only informed guesses. Feeling the pulse and diagnosing the ills of a region of human settlement remain, like medicine itself, an art. But we can describe the symptoms which accompany a maladjustment between people and the land.

Population capacity in Middle Chile cannot be defined in terms of the number of inhabitants alone. It is also a matter of capacity to produce, capacity to make effective use of the resources of the land. Population capacity was one thing for the native Indians who could plant maize only on the valley soils recently moistened by natural floods. Population capacity was increased when the Incas taught some of the Araucanian tribes how to build and maintain crude systems of irrigation. Population capacity was still another thing for people who understood the cultivation of wheat. The number of people that can be supported adequately under the hacienda system is much smaller than the number that could be supported if modern agricultural techniques were adopted. The population capacity of the land would be still greater if a larger proportion of the arable area were included in small properties, provided these properties were not too small. But in none of these circumstances could a rigid quantitative limit be stated, beyond which the region might be described as overpopulated; for, as the pressure of the inhabitants on the supplies they are able to derive from the land increases, various kinds of minor readjustments are made, generally in the direction of a very gradual decline in the material standard of living. Eventually, increasing pressure of this sort can be relieved only by a decline in the birth rate, by emigration to distant regions, by expansion to neighboring areas, or by a definite change in the techniques of gaining a living within the area. Otherwise the region slowly develops more and more symptoms of poverty.

Population increase in Northern Middle Chile has, actually, been absorbed in six different ways during the long period in which the density of the rural population has remained unchanged. First, the recruiting of the army for the war with Peru and Bolivia jarred many of the inquilinos out of their traditional attachment to the haciendas. Second, the rise of the nitrate industry in Northern Chile attracted workers who came in a steady stream from Middle Chile until the industry declined and the plants were closed. Third, the rise of other mining industries, chiefly copper and coal, absorbed additional numbers of workers from Middle Chile. Fourth, a steady current of emigration carried some of the

excess population of Middle Chile across the Andes into the Argentine oases on the eastern side. Fifth, a large number of people from the rural districts of Northern Middle Chile became the pioneers who pushed the frontier of settlement southward into the forests of Southern Middle Chile. And sixth—and of greatest importance—within Northern Middle Chile itself, the large manufacturing cities, whose rise began during the First World War, are today absorbing a very large part of the excess population of the rural districts. In these various ways, partly by expansion, partly by emigration, and partly by internal rearrangement, Chile has taken care of its increasing numbers without increasing the rural population density of the nucleus; but the fundamental problem of a revision of the system of rural land tenure remains essentially unsolved in spite of the attention given to it in recent years by the Chilean government.

SOUTHERN MIDDLE CHILE

One of the effects of population pressure in the center was expansion southward into Southern Middle Chile—Chile's frontier. This region, which begins at the Río Bío-Bío and extends southward to Puerto Montt and the Island of Chiloé, is remarkably different from Northern Middle Chile. Abruptly at the Bío-Bío the open scrubby forests of the lands of summer droughts give way to dense forests supported by a heavy rainfall which comes in all months of the year (Map 45). But a land of trees was not attractive to the Spaniard whose birthplace and most of whose experience had been in treeless countries. He reacted to dense forests in much the same way that the North American pioneers reacted to the open prairies—he was repelled by them. Only during the last eighty years have pioneers made serious entry into this southern region. Now, as in our own West, the frontier days are only a memory: today the region is one of established settlements, but settlements of a very different kind from those north of the Bío-Bío. Instead of irrigated fields on sloping alluvial fans, here are lands cleared of the forest, bristling with stumps and littered with the wreckage that accompanies forest-clearing the world over; here, instead of the mud fences and the white-washed mud buildings with thatch or red-tile roofs characteristic of the north, are frame houses roofed with shingles; here the long stately rows of Lombardy poplars and the graceful weeping willows are entirely lacking; here, instead of the large estates of a landed aristocracy, there are medium-sized farms, few more pretentious than the others, for rural democracy is a system which flourishes best under pioneer conditions.

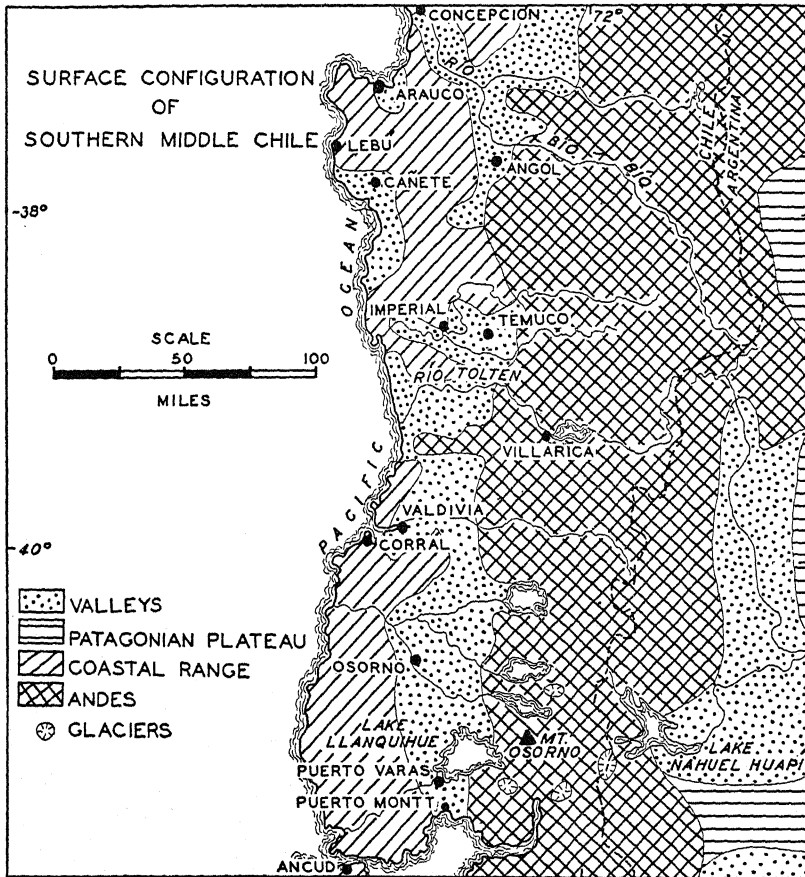
The contrast between the region north of the Bío-Bío and that south of it is a contrast of more than superficial aspect—it is a contrast of social systems, a contrast of attitudes of mind. For a forest-bred people this region is potentially as rich as the desert of the north was for a people who understood best the exploitation of mineral wealth.

Surface Features

The fundamental elements of the land in Northern Middle Chile are continued southward (Map 6). On the east the Andes dominate the scene; on the west the Coastal Range borders the sea, extending the length of the Island of Chiloé; and between these two ranges is the Central Valley.

The Andes are not so high in Southern Middle Chile as they are to the north, and the passes through them are much lower. During the glacial period the work of the glaciers, which was limited to the higher parts of the Cordillera at the latitude of Santiago, was extended to lower and lower altitudes with the increase in distance south of the equator. At latitude 39° S., just a little south of Temuco, the valley glaciers at one time emerged from the mountains into the Central Valley in great tongues of ice. The glaciers scraped and broadened the mountain valleys into U-shaped troughs, and around their lower ends they piled the coarse gravel they had torn from the heart of the Cordillera, forming a horseshoe pattern of knobby morainic hills. Behind each moraine, south of latitude 39° S., there is a valley lake—similar in origin to the famous lakes of the Alpine piedmont in Italy (Map 44). Above these lakes the mountains take on more and more of the features of a range heavily sculptured by the ice —sharp horns, high cirques, deep valley troughs. At present only a few small relict glaciers are to be found high in the mountains in sheltered spots facing to the south, but the limit of permanent snow is lower than it is near Santiago: at the head of the Bío-Bío it is between 6,500 and 8,000 feet (depending on the exposure); inland from Valdivia, about latitude 40° S., it is approximately 5,000 feet above sea level. In this region, where the rocky slopes permit, the dense forest reaches the snow line, leaving no intermediate zone of alpine pastures for the summer grazing of cattle and sheep.

In addition to the glacial features the landforms of the Cordillera are varied by the appearance, south of latitude 35° S., of a row of enormous cone-shaped volcanoes, snow-covered at their summits. These volcanoes stand to the west of the main Cordillera adding a touch of scenery

to the Chilean lake district which places this region among the most spectacular of the world. Their appearance is remarkably similar to that of the great volcanoes of the Pacific Northwest of the United States, like Mt. Hood or Mt. Rainier—except that the Chilean volcanoes are still active.

Map 44

The Coastal Range borders the Pacific as it does in Northern Middle Chile. After the gap at Concepción, the range again appears in typical form—the form of a dissected plateau—in the peninsula of Lebú. In elevation it is about the same as the region north of Concepción, reaching a maximum south of Valdivia of about 5,000 feet. Along the backbone of the island of Chiloé the range is approximately 2,600 feet in altitude. Drowned river mouths at Talcahuano and Valdivia provide the best harbors of all Middle Chile.

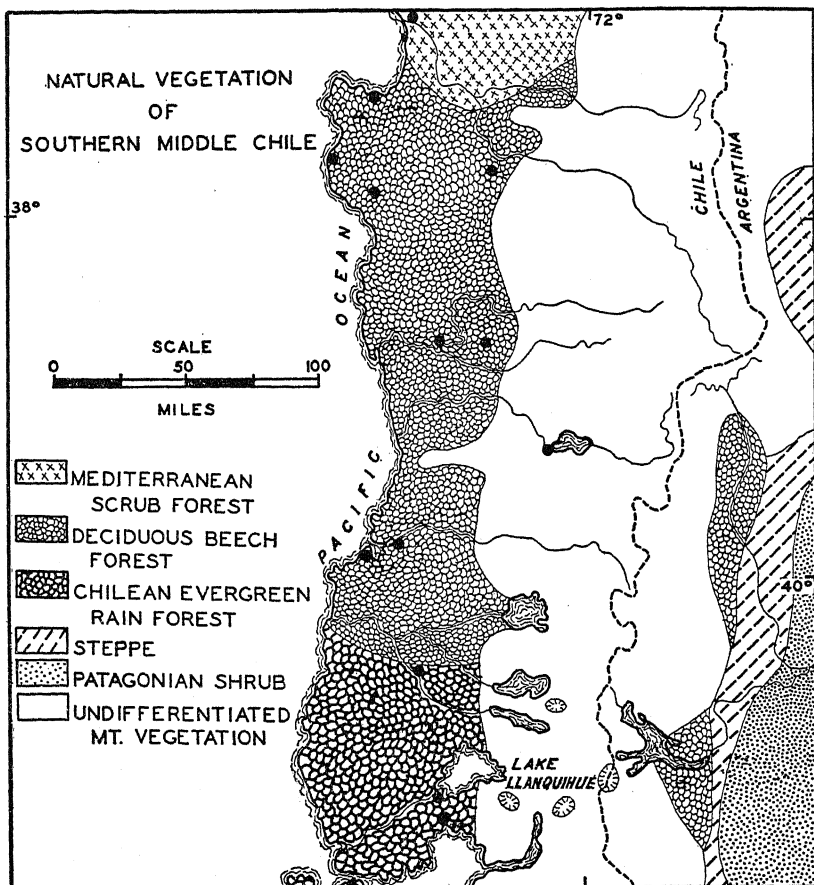
The Central Valley also continues into Southern Middle Chile. Its eastern margin, however, is no longer smoothed by the broad alluvial fans: instead its Andean border is festooned with moraines and dotted with marginal lakes. The rivers cross it at right angles, and between these rivers spurs of the mountains separate the valley into a series of compartments. The valley floor continues southward from the Bío-Bío at approximately three to four hundred feet above sea level. It ends abruptly at Puerto Montt, descending to sea level in a series of terraces which remind one strongly of the northern end of the Puget Valley at Tacoma in the state of Washington.

Climate and Forest

There is a very close similarity, also, between the climates of Chile and those of the Pacific Coast of the United States. Traveling southward in Chile, or northward in California, one leaves a climate of mild, wet winters and dry summers for a climate of stormy winters and cool summers which, although not so rainy as the winters, are nevertheless not dry. Many days with gray skies, many violent storms, very heavy rainfall—these are the characteristics which distinguish the west-coast climates of all the continents poleward of approximately 40°. Valdivia has about the same average temperature in its warmest month as Tacoma, Washington (Valdivia, 61.9°; Tacoma, 62.2°); but its coldest month is milder than that of Tacoma (Valdivia, 45.5°; Tacoma, 38.3°). Valdivia, however, receives almost three times as much rainfall as does Tacoma (Valdivia, 104.8 in.; Tacoma, 40.4 in.). Storminess increases toward the higher latitudes, and is greater, latitude for latitude, in Chile than in North America. Southern Chile is one of the stormiest parts of the world.[9]

The division between dry summers and wet summers is sharp in Chile —much sharper than in North America. On the coast the change takes place just north of the town of Lebú; in the Central Valley the boundary follows closely the course of the Río Bío-Bío. Corresponding to the climatic change there is also a marked change in the natural vegetation. The mediterranean scrub forest ends at the Bío-Bío; to the south are the dense, mixed forests of beech and cedar, standing on ground which, as

[9] The storminess can be appreciated from the following quotation regarding the weather of Chiloé: "Number of days in the year marked by tempest, 17; storm, 25; squall, 93; rain, 108; cloudy weather, 20; variable weather, 93; sun, 51." Quoted from Alfredo Weber by G. M. McBride (88), p. 317.

long as the forest is not cleared, hardly ever dries out. Good land for agriculture north of the Bío-Bío is land which can be moistened; good land south of the Bío-Bío is land which can be dried. Some of the drier soils are marked by grassy meadows which interrupt the generally thick

Map 45

cover of forest. The gravelly moraines, which also offer good land for crops where they are not too steep, were originally covered with trees. South of Osorno the forest is so dense and wet that it cannot even be burned off. Here the mildness of the winters and the very heavy rainfall give the forest an evergreen character—an evergreen, broadleaf forest which is far more difficult to penetrate than the tropical selva because of the dense growth of underbush (May 45).

First Contacts with the Araucanians

In both the Inca period and the period of Spanish colonization the sharp climatic and vegetation boundary along the Río Bío-Bío has been persistently reflected by a sharp cultural boundary. Yet the significance of the physical contrast between the regions separated by the Bío-Bío has been different for each of the peoples who have occupied this part of Chile. The Araucanians, a hunting people, knew how to live in the forest and support themselves from the supply of game, which they supplemented by incidental and temporary farming. But to both the Incas and the Spaniards, who were not familiar with forested country, the heavy woods of Southern Middle Chile were "unfriendly." The Araucanians could scarcely have withstood the all-conquering armies of the Incas and the Spaniards without the protection afforded by the forest. But were the Incas and Spaniards defeated by the Araucanians, or were they defeated by their own lack of knowledge of how to live and how to fight in the woods? Would the Bío-Bío have been a barrier to people like the English and French pioneers of eastern North America? At least we know that people familiar with the woods carved homes out of similar forests in other parts of the world; and it was the forest-loving Germans who finally led the way into the heart of Chile's southern frontier. The significance of the forest was neither inevitable nor predetermined until the arrival of the particular kinds of people who settled Chile made it seem so.

As a matter of fact, the Spaniards who conquered the Inca Empire, and who marched across deserts and high plateaus to seek wealth and position in Chile were not the kind of people to stop on the borders of unfamiliar country. Under the leadership of Pedro de Valdivia these fearless adventurers plunged southward into the heart of Araucanian country. Before 1560 they had placed settlements on navigable waters at Arauco, Imperial, Valdivia, and on the island of Chiloé at Castro (Maps 44 and 56); and they had even placed settlements inland wherever meadow lands offered them the opportunity—at Cañete, Angol, Villarica, and Osorno. The Araucanians were divided into groups, according to the encomienda system, and allotted to the favorites among the officers of the army. But the Araucanians were not like the Quechuas, nor were they as powerless as the tribes farther north who had no woods in which to fight. Almost constant Indian attacks, with the Indians invisible behind the trees, finally culminated in a great uprising which, between 1600 and 1602, resulted in the almost complete elimination of the Spaniards

from the region. The only settlements that survived were those at Arauco, Valdivia, and Castro. The others were all destroyed, and the Spaniards, without much regret, abandoned the region.

For more than two hundred years Southern Middle Chile was Indian country. The seminomadic Araucanians established fixed settlements as, little by little, they adopted ideas which crossed the frontier. Their communities were not clustered in the Spanish manner, but it was customary for each family to remain as a separate unit of settlement. They practiced a shifting cultivation of maize and potatoes, chiefly in the meadows and glades where the heavy labor of clearing the forest was not necessary. From the Spaniards they adopted cattle and poultry. Along the frontier, and around the isolated Spanish settlements of the coast, the warfare and the raiding never ceased. Only Castro, on its island, was safe. Not until 1885 did Valdivia form a land connection with the rest of Chile.

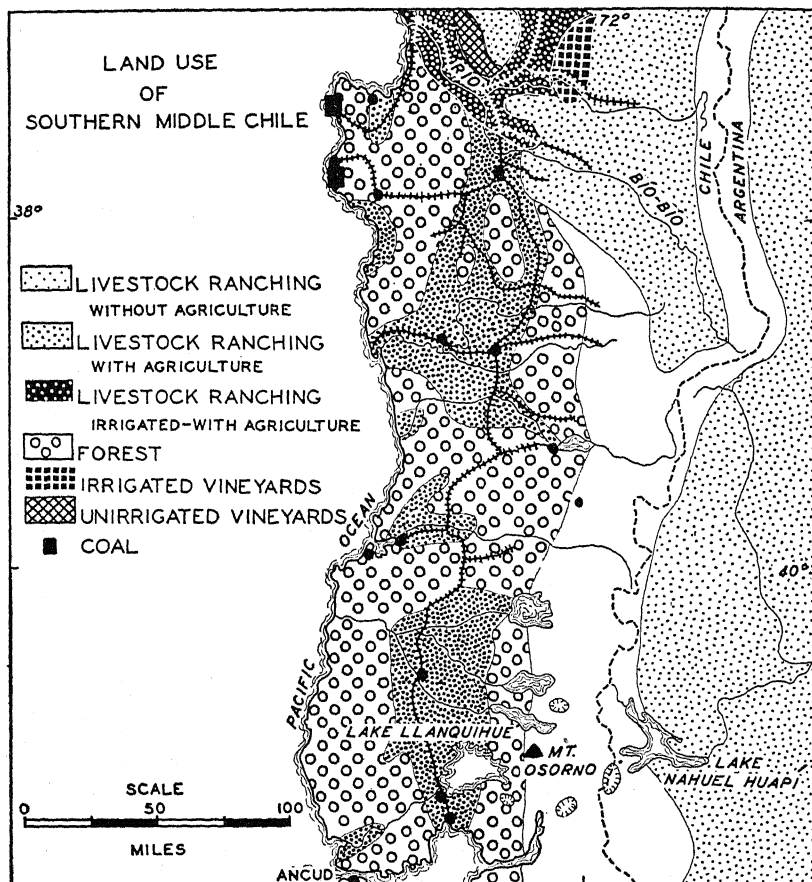
Settlement of "Araucania"

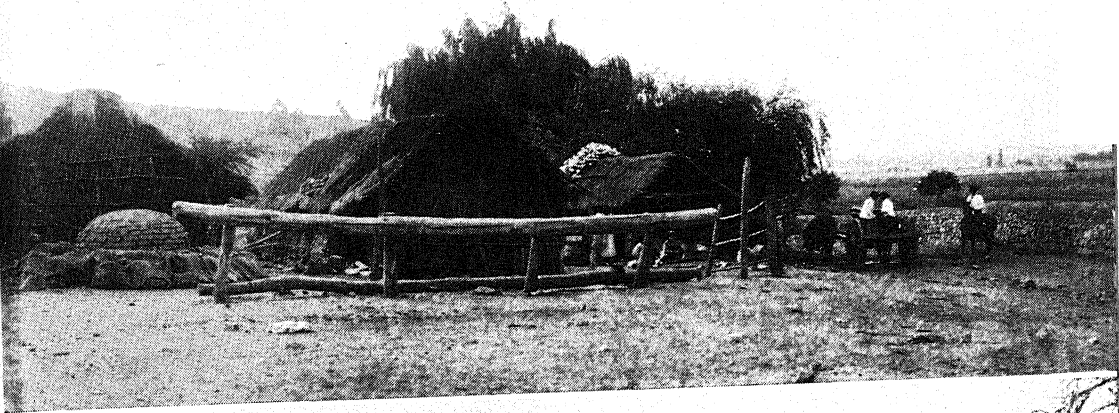
The Araucanians and the Seminoles of Florida have the distinction among all the Indian tribes of the Americas, of never having been conquered by force of arms. They were conquered, little by little, by contacts with the white man's civilization. Even today, however, this sturdy group of Indians, now incorporated in the Chilean nation, persists in its occupation of a part of the southern region. There are more than 70,000 Araucanians concentrated in the valley of the Río Tolten, south of Temuco, and more than 100,000 in Southern Middle Chile as a whole; and their number is slowly increasing. Their communal holdings are being redistributed in the form of private properties—in which change the Araucanians themselves are now assisting.

The first serious steps leading to the establishment of settlements in the interior were taken by foreign immigrants in the decades which followed 1850. Small groups of Germans, each group containing only a few hundred people, were established between 1850 and 1854 near Valdivia, at Puerto Montt and at Puerto Varas on the shores of Lake Llanquihue. Pioneering was not easy in this wet country where travel through the forest was almost impossible during the winter months, but the German colonists showed what could be done. Up to 1864, when the arrival of new settlers from Germany practically ceased, the total number who had entered this part of Chile was only 3,367. Even today they form an insignificant proportion of the total population—not more than about 30,000 in all of Chile including Chilean-born descendants of the

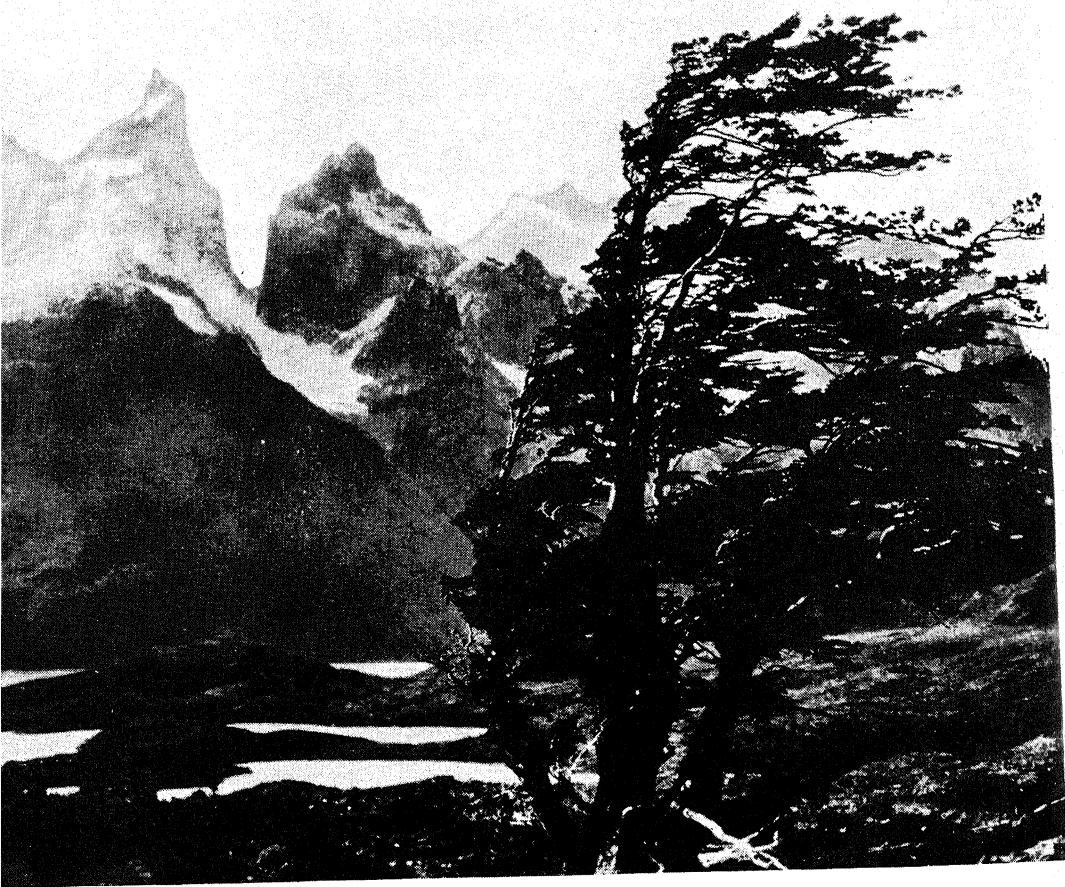
immigrants. But these Germans were great pioneers: they were willing to work very hard to produce the material comforts which they were not content to be without; their homes were substantial and permanent; they built good roads; their agricultural techniques were carefully maintained even in the face of obstacles. By industry and persistence these few colonists exerted great influence on the settlement of Chile's frontier. The census of 1930 shows 9,808 foreign-born people in the southern region, of whom some 3,000 are German. There are, also, nearly 2,000 Spaniards, and smaller numbers of French, Italians, Swiss, and other European peoples. The Germans, here as elsewhere in the Americas, soon gave up political allegiance to the fatherland, in spite of recurring rumors to the contrary; but they did implant a distinctly German civilization in the new land—distinctly German in the architecture of the buildings, the agricultural methods, the cleanliness, the emphasis on schooling, and in the social manners and customs of even the second and third generations.

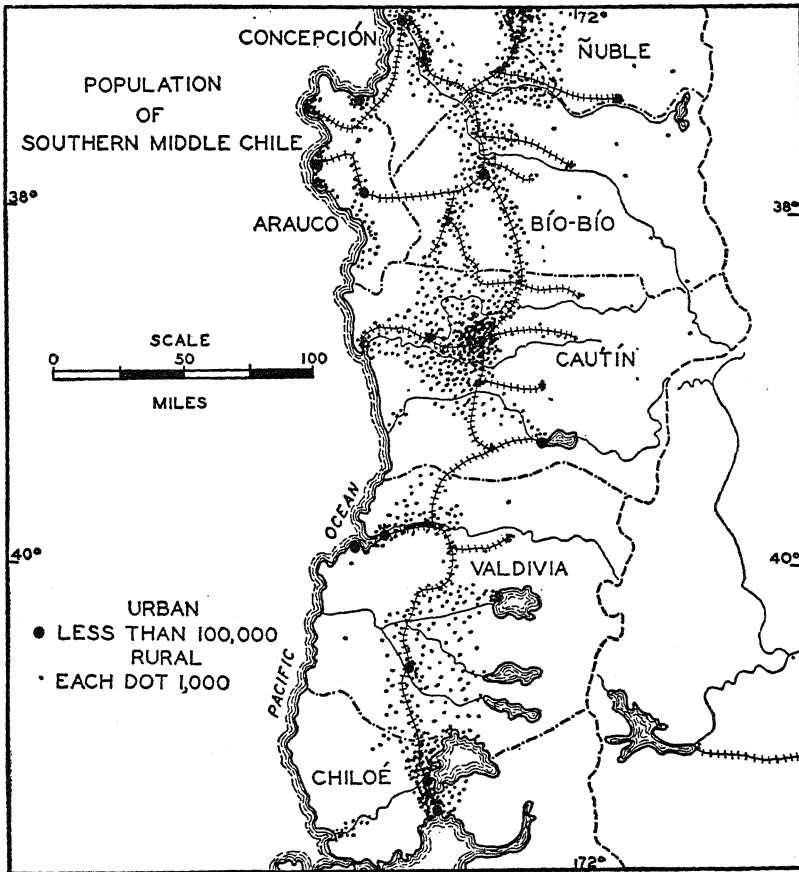
While these foreigners led the way, and still play a part in the economic life of the region out of all proportion to their numbers, the great flood of pioneer settlers came from Northern Middle Chile, largely recruited from the inquilino class. After the conclusion of the war with Bolivia and Peru the returning army was sent to the southern frontier finally to establish the Chilean control of the Araucanians. Chile might have pursued the policy of settling its soldiers on this frontier, but the opposition of the ruling class to this procedure was considerable, arising from the desire for an abundance of labor in the older parts of Chile. Nevertheless about 6,000 new colonists were settled in the south, and probably many more became squatters on Indian communal lands and escaped the official census. The number of settlers was no doubt greater than it would have been if war had not broken the strong traditional ties of the Chilean inquilino with his hacienda. At any rate, the number of settlers in the years after 1883 was large. The population of Province of Valdivia, for instance, which had only 8,860 inhabitants in 1835, increased to 53,090 in 1875, and to 133,443 in 1907. The population of the provinces carved out of the old frontier was, in 1930, 893,122. While relatively few upper-class Chileans are involved in this movement—and for this reason Chilean literature, which is almost exclusively the product of the upper classes, has shown little of the effect of the frontier—the migration of people from Northern Middle Chile accounts for about one in every five persons; continued over the decades it has been one of the most potent forces in the transformation of Chilean life.

Today the frontier region in Southern Middle Chile is largely occupied. Only in the wet evergreen forests southwest of Osorno are arable lands still available for pioneer settlement. The great earthquake of 1939 which destroyed Chillán and did severe damage to Concepción resulted in a considerable movement of people to this last bit of southern frontier.

Map 46

The farms of Southern Middle Chile are devoted chiefly to the raising of livestock, and to a lesser degree to the production of food crops. About 40 per cent of the cattle in Chile are raised on the rich green pastures south of the Bío-Bío. Most of these animals are used for meat rather than for dairy products, although the cool, moist climate with mild winters is ideally suited to a dairy economy. Because of the absence of pastures in the Andes, transhumance is not practiced in Southern Middle

These two pictures illustrate the contrast in living conditions between the Chilean *inquilinos* and the landlords. The upper picture is of a group of tenants' homes. The man on horseback is the owner of a large hacienda, including a section of the Central Valley (right background), and a large area in the Andes, the lower slopes of which appear at the left. The lower picture (courtesy of the Grace Line) shows the home of a landowner, set in the midst of ornamental trees and flower gardens. Life for the fortunate minority can be idyllic.

At the top is a panoramic view of Santiago, capital of Chile. This picture was taken from one of the tall buildings looking toward the east. In the left foreground are some of the government buildings, and behind them the office buildings of the commercial center. In the left background the prominent hill is the Cerro San Cristóbal, which overlooks Santiago from the north (Map 41), and from which a magnificent view of the city can be had. The wide avenue in the center used to be called the Avenida de las Delicias, but has recently been renamed Avenida Bernardo O'Higgins, after the Chilean hero of the wars of independence. In the background, at the right of the avenue, are the slum districts. The snow-covered Andes overlook the Central Valley from the east. The

the lower slopes of the Coastal Range around a crescent-shaped bay which is sheltered only from the south. The city is built on several levels and there are elevators to carry passengers from one level to another. One of these elevators can be seen near the right-hand margin of the picture. The business district is along the waterfront, the residences are above, and the slums are on the hilltops overlooking the whole amphitheater as from the highest gallery of an opera house. (Both photos, courtesy of the Grace Line.) The lower picture on the right shows the community of Sewell at El Teniente copper mine (Map 42). This mine is owned by the Braden Copper Company. (Courtesy of the International General Electric Company.)

The upper picture shows Puerto Varas, the German colony on Lake Llanquihue (Map 44). In the background are Mt. Osorno (left) and Mt. Calbuco (right). The presence of the Germans is reflected in the architecture, the common use of wood, and the prevailing cleanliness. (Courtesy of the Grace Line.) The lower picture, taken near the coast in Southern Chile, gives a vivid impression of a land of violent winds, and driving clouds and rain. It is a land of steep moun-

Chile, but there is a more or less regular movement of herds and herders through the relatively low passes to the oases of northern Patagonia in Argentina, especially Neuquén. At one time a considerable number of Chileans emigrated permanently to that oasis, and there is still a small current of immigration across the Andes into Argentina.

Map 47

Less than 20 per cent of the total area of Southern Middle Chile is devoted to food crops. On this area, however, is produced an important share of Chile's wheat crop—mostly soft wheat which is adapted to the rainy conditions of the climate. Most of the wheat lands are in the territory just north of Temuco. In addition to wheat, the crops include potatoes, oats, apples, and hay. In spite of the abundance of trees, some of which could be used for lumber, Chile does not have a large

lumber industry. Lumber is still imported, while the forests of the south are burned to make room for pastures or crops. The woods of the forest are utilized at only a few places where nearby markets create a demand: around Valdivia, for instance, where there are furniture factories; or on the island of Chiloé where there is a boat-building industry. Otherwise the forest is used only for fuel.

Settlement of Chiloé

The island of Chiloé, which occupies a geographical position very similar to that of Vancouver Island in North America, must be included in the frontier region of Southern Middle Chile. But the settlement of Chiloé presented even greater difficulties than that of the mainland. The rainfall is so heavy that the extraordinarily dense evergreen forests cannot be burned. Apparently the cost of cutting the trees and pulling the stumps is so great that agriculture is not profitable. The colony of Castro, and others established later, such as Ancud (Map 44), have never been very successful. A scanty population, grouped in isolated patches along the east coast, especially around Castro, and on some of the islands east of Chiloé, is able barely to maintain itself against the forest.

THE SOUTH

From Chiloé southward stretches the other third of Chile—the South. On this third of the national territory there is a scant 1 per cent of the total population of Chile. This is the only frontier Chile has left today, and while settlement is possible at many isolated places along the vast stretch of country, probably no large numbers of people can be settled permanently there.

The Land

Southern Chile is a region of high winds and heavy rains, a region of steep rocky slopes and storm-tossed waters. Glacial activity in the Andes, during the Ice Age, was increasingly vigorous toward the south. The glacial troughs of Southern Middle Chile are small compared with the deep excavations made by the ice farther to the south—excavations that completely cross the range, so that the streams draining to the Pacific in many instances have their headwaters on the eastern side of the mountains. The glacial troughs are drowned along the coast, forming an

amazingly intricate pattern of channels and islands (Map 56). Between Puerto Montt and about latitude 44° S., structural conditions similar to those in Middle Chile continue southward, partly under the water. But south of 44° S. the Central Valley disappears—there is only a labyrinth of fiords with steep rocky margins, with a dense tangle of soggy forest wherever trees can fix their roots; a landscape almost constantly shrouded in cloud and driving rain; the outermost islands shaken by the pounding surf where the world's stormiest ocean dashes against a continent.

The snow line descends rapidly toward the south. On the volcano Osorno in Southern Middle Chile it is about 5,000 feet above sea level. In Tierra del Fuego the zone of permanent snow is only 2,300 feet above the sea. The tops of many of the mountains are covered with ice caps; at several places glaciers still discharge icebergs into the coastal fiords.

It would be difficult to find a more unpleasant climate. There are few hours of sunshine, few hours when the wind is not blowing. Rainfall reaches more than 200 inches per year in certain places. At Evangelist's Island, opposite the western end of the Strait of Magellan, the temperature of the warmest month averages 46.8°, and of the coldest month 39.0°. Snow and sleet are common throughout the winter. Only protected places offer somewhat better conditions—for example, Punta Arenas[10] near the eastern border of the mountains on the Strait of Magellan. At Punta Arenas the average temperature of the warmest month is 52.5°; and this place, being in the lee of the mountains, receives only 19.4 inches of rain. The section of the border between Chile and Argentina which runs east of the mountains, and even gives Chile a small stretch of east coast at the eastern end of the strait, includes the only part of Southern Chile where any important numbers of settlers are to be found.

The Inhabitants

Some of the world's most primitive tribes occupy this southern coastland of Chile. Apparently the weakest of them occupy the poorest place at the very extremity of the continent, having been pushed there, no doubt, by the stronger peoples farther north. The several different tribes of this part of South America (Map 4), all of whom speak distinct languages and have quite different culture traits, can muster all together not more than a

[10] Punta Arenas was renamed Magallanes; but the former name has now been restored.

thousand people. The sections of the coast they occupy are mostly shut off from other sections by barriers of one kind or another. With their canoes these peoples are able to travel along the inland fiords, living chiefly on fish. Peninsulas, such as that of Taitao, or of Brecknock at the western end of Tierra del Fuego, make it necessary for mariners to face the waves of the open ocean if a passage is to be made by boat; they are major barriers and dividing lines between the culture areas (Map 56).

This great southern region of Chile has in it about 28,000 Europeans. There are two chief towns—Puerto Aysen, far inland at the head of a fiord at about latitude 45° S., and Punta Arenas, on the Strait of Magellan. On the latter city focuses the chief activity of the settlers of this region, sheep raising. The 2,000,000 head of sheep in the territory north of Punta Arenas provide a source of wool. For a time, also, a small coal field not far from Punta Arenas was worked and the fuel was sold to passing steamers. A few parts of this vast region could be utilized for the establishment of colonies, but no large movement of people into it is to be expected.

THE MINES OF COPPER, IRON, AND COAL

Punta Arenas is 1,200 miles by boat from Middle Chile. As we return to the heart of Chile and to the problems it contains we realize that this vast southern domain, like the great desert of Atacama in the north, is really a part of Chile only in the sense of belonging to that country. Neither of these parts of the total national territory can offer much assistance in the solution of Chile's problem of population.

Of the six ways in which Chile's population increase has been taken care of since 1870 without increasing the density of people in the rural districts of Northern Middle Chile, we have already described four—the recruiting of troops for the army; the temporary employment of labor in the nitrate fields; the expansion of the frontier into Southern Middle Chile; and the emigration of Chileans to the Argentine oases. Two other outlets for an increasing population remain to be discussed.

The Copper Mines

Chile's mining communities, exclusive of the nitrate communities of the Atacama, are chiefly engaged in the exploitation of copper, iron, and coal resources. There are three major copper camps, all in the Andes,

and all owned by North American capital. El Teniente, southeast of Santiago (Map 42), was the first of these three to build modern types of smelters which could make use of low-grade ores. Such smelters were put into operation there in 1904. In 1932, the mines produced 50 per cent more copper than the total of the decade from 1851 to 1860 when Chile's production was coming only from high-grade sources. Meanwhile, Chile had lost its commanding position in the world copper market—a position which it might have recovered with the new processes had not the world depression and the discovery of huge bodies of ore in Africa cut the demand for Chilean copper. The other big copper camps at Potrerillos and Chuquicamata[11] are similarly equipped with modern smelters. The Potrerillos smelter ran at about 65 per cent of its capacity in 1927, but dropped to 20 per cent in 1934. Copper, like nitrate, is a war material of such importance that many nations fear dependence on such a distant source of supply as Chile. The result is that the nations hoard their supplies, and the market price suffers extreme and unpredictable fluctuations. Chile's still abundant reserves are unable to find a steady market; each fall in price bears heavily on the population centered around the mines and smelters.

Iron and Coal

Chile is at present South America's leading exporter of iron ore. There is an ore body of good quality only about five miles back from the coast near the little port of Cruz Grande which is a short distance north of Coquimbo near the southern end of the desert (Map 40). A North American steel company has developed the port and the mines, connecting the two with an electric railroad. A small population is supported by the mining and transportation of the ore, all of which is sent away in a fleet of ore boats to Sparrows Point in Maryland, where it is smelted.

Chile is also South America's leading producer of coal. Chile's coal is lignite or subbituminous, which, for many purposes, must be mixed with imported coals; without tariff protection it can compete with imported coals only in the immediate locality of the mines. Two companies owned by Chilean capital now operate at a profit behind government protection. The mines are located on the Lebú Peninsula, overlooking the Pacific (Map 46). Here, since 1840, a small population has been supported by this activity.

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[11] See the chapter on the Atacama and Map 40.

THE GROWTH OF THE INDUSTRIAL CITIES

The sixth way in which Chile's population increase has been absorbed, and in recent decades the most important way, is in the development of the industrial cities. In the midst of a country characterized by large estates and by a feudal society of long standing, the rise of commercial and manufacturing cities, inhabited by a growing middle class of shopkeepers and business men and by industrial wage workers, creates a new contrast of great significance. Chilean life stands on the threshold of a major transformation.

Although Chile has many small cities and towns, only four can be classed at present as centers of urban industrial development. The most important of these is Santiago, the capital. Santiago was laid out in 1541 on the typical rectangular plan which the Spaniards used almost everywhere in that period. As the focus of the political life of the thriving new colony, Santiago soon established its position as the largest and most beautiful of the Chilean cities. By 1865 the national capital had a population of 115,000. The rate of growth turned up sharply during the First World War, and by 1920 Santiago had passed 500,000. In 1935 estimates gave the city about 700,000 inhabitants. The original rectangular nucleus is now the hub or center of a wide zone of industrial suburbs and slums where the growing city has invaded the surrounding countryside.

Chile's second city is the port of Valparaiso, located near the mouth of the Río Aconcagua at the outlet of the productive Vale of Chile. A railroad descends to the coast through a narrow valley cut deeply into the Coastal Range, and reaches the sea at the beautiful residential and resort town of Viña del Mar, only a short distance north of the port. Valparaiso itself is built on a north-facing bay which provides shelter from the southerly winds. The steepness of the slopes of the Coastal Range made the use of a rectangular pattern impossible: the streets at successively higher levels follow the semicircular contours of the bay; so steep are the connections between different levels that elevators have been installed to carry passengers from one level to another. The business district is built on a narrow terrace near the edge of the water; above it are residential areas; and, higher up, hilltop slums overlook the whole scene. A breakwater now gives the bay protection from the storm winds from the north, and makes it possible for ships to tie up at docks. In 1930 Valparaiso had a population of 189,000, and Viña del Mar, really a suburb of the port city, had another 50,000.

The two other urban centers of Chile are Concepción and Valdivia. Both these cities are built along the banks of rivers where a lowering of the coast has created small estuaries. Concepción, on the Bío-Bío, is served by its port, Talcahuano, placed where the water is deep enough for modern steamers. Valdivia has also built an out-port, Corral, located on the deeper water near the mouth of the river. Concepción now has a population of over 75,000, and Valdivia has a population of over 35,000.

Rise of the Urban Industries

These four cities—Santiago, Valparaiso, Concepción, and Valdivia—contain the majority of Chile's new manufacturing industries. Many of the plants were built during the First World War, at a time when Chile was cut off from its accustomed sources of manufactured articles. In 1900 only forty-four million Chilean pesos were invested in industries, including mining industries; but by 1928 the amount has been increased to two billion, two hundred million pesos. A considerable proportion of this investment has come from foreign sources, chiefly North American, but there is also a new capitalist class in Chile which began its rise on the wealth acquired in the nitrate business. In the south almost all the industrial establishments are owned by Chileans of German descent, whose activity and economic background are responsible for bringing the urban way of living to Concepción and Valdivia.

The Chilean industries are based chiefly on local sources of raw materials and on hydroelectric power. There are flour mills, breweries, bodegas (wineries), sugar refineries (refining Peruvian raw sugar), textile factories (mostly wool), furniture factories (chiefly in Valdivia, using local supplies of wood), leather tanneries and shoe factories (mostly in Santiago, Concepción, and Valdivia). There are also plants which produce cement, glassware, soap, paper, matches, tobacco products, and many other items. In 1932 there were about 80,000 workers employed in some 7,000 manufacturing establishments; but since that time there has been a considerable amount of expansion. The Chilean factories are protected by a high tariff barrier, and are dependent on the purchasing power of the Chilean people, which is too low, according to some observers, to support a sound development of large-scale manufacturing. Except for small exports to Bolivia and Peru, the Chilean industries have no foreign outlets. Under these conditions industrial growth only serves to increase the already high cost of living in Chile inasmuch as it substitutes costly domestic goods for goods which might be imported more

cheaply. Nevertheless it is this industrial growth with its considerable use of hydroelectric power, together with the development of big mining industries, which puts Chile in first place among all the countries of Latin America in the per capita use of machine energy.

Effect of the City on the Hacienda

In the process of absorbing the population increase of Northern Middle Chile the city has exerted a profound effect on the traditional agricultural system. In the first place not a few of the landlords have been able to accumulate fortunes through their investments in mining and industrial enterprise, and to a greater and greater extent the attraction of city life is drawing the upper classes away from the rural districts. Prestige in Chilean society can now be gained through the accumulation of wealth as well as through the ownership of land—a transformation which has been accompanied by much internal friction. The increase in absentee-ownership in the rural districts, however, has been one of the more potent causes of the impending breakdown of the old system, for no longer are all the inquilinos cared for under the direct supervision of the landlords.

Since the frontier no longer offers free land for inquilinos who have broken loose from their haciendas, the city is the only place to which they can go. But as urban laborers the former inquilinos, now known as *rotos*, are scarcely better off than they were as rural workers. Wages are still very low, and the living conditions in the poor districts of the cities are deplorable. The high infant mortality is a feature not only of the country districts, but of the cities as well. The rapid population increase of a class of people who are not only without property, but whose incomes are so low that they feel little interest in the maintenance of the existing order of things, constitutes a social menace in any country.

CHILE AS A POLITICAL UNIT

Chile offers us another illustration of the theme that generalizations about Latin America or Latin Americans as a whole are unsound. In the nature of its social, economic, and political problems, in the geographic distribution of its population, as well as in the character of its land, Chile stands in strong contrast to all the nineteen other Latin-American states. Although it must be included among the big three—the ABC countries—in terms of commercial production and political importance,

the processes which have brought Chile to this high place and the problems the nation now faces are not at all like those faced by Argentina or Brazil. Furthermore, when we look beneath the apparent unity of Chile's one nucleus of population, we find an actual diversity which must be understood before it is possible to evaluate Chile's relations to the rest of the world, or to comprehend the domestic problems now being fought out.

Chile's External Relations

Chile also illustrates another theme: that commercial contacts with the outside world and lists of exported commodities may have little relation, and, at that, perhaps only an indirect relation, to the characteristics of a country. For Chile has been and still is a predominantly mineral-producing country as far as exports are concerned; yet the mining activities are carried on by only a handful of people, not more than 80,000 out of a population of over four million.

Nitrate and copper comprise from 50 to 80 per cent of the value of Chile's exports. From early in the nineteenth century until 1880 Chile held a dominant position in the world copper market, supplying 40 per cent of the world's production between 1841 and 1850, and more than 40 per cent in the decade from 1861 to 1870. This position was based on the exploitation of certain high-grade ores. When the new smelting process was developed in Utah about the beginning of the present century the United States took the lead in copper production, since the new process made the use of relatively low-grade ores profitable. Now Chile also has smelters which use the new process and so can work the poorer deposits. In 1938 Chile produced 76 per cent of the copper of Latin America, but conditions in the world market have not yet permitted the smelters to operate at capacity.

For several reasons, however, this dominance of commerce in minerals is one which the Chileans deplore. In the first place, the instability of the population dependent on the mining industries for support is notable, especially in the Atacama where there is no other way of making a living when the income from the production of nitrate diminishes. In the second place, the dominance of the foreign trade by nitrate and copper leaves Chile almost powerless to control its own commercial destinies, for the nitrate business is owned mostly in London, and the copper business almost exclusively in New York. In the third place, since most of the government revenues have come from export taxes on copper and

nitrate, the whole political structure of the country rests on the unstable conditions of the world mineral market.

Political Instability

Chile was long considered one of the most stable countries of the southern continent. Its political life had been disturbed by few troubles, and the successive governments had all been dependable in meeting foreign obligations. Since 1924, however, Chile has had five military coups, three dictatorships, and one popular revolution. These disturbances are produced by conditions far more fundamental than matters of foreign trade or even of government revenue, but the decline in revenues was an important contributing cause. In 1931 and 1932 Chile was plunged into a financial disaster far worse than that experienced by any other country in South America. Its exports dropped to less than one sixth of their 1929 value, and the government revenues dropped to less than one third. But political instability, marked by a swing to the left, results from conditions inherent in Chilean society, rather than from the shrinkage in foreign trade, the decline of government revenues, or the alleged activities of foreign agitators.

The Agrarian Problem

The real Chile is still agricultural, even though agricultural products make up less than 15 per cent of the total export trade. It is estimated that 40 per cent of the Chileans derive their living directly from the land. Yet the agricultural products of the country are not sufficient to meet the demands of the home market. Cattle, wheat, fruits, and even forage are imported in amounts which vary from year to year. Usually there is an exportable surplus of oats, barley, lentils, beans, and sheep's wool. But on many occasions, as, for example, in 1937, there is not enough wheat.

The fundamental difficulty is the hacienda, and the rigid class distinction between landowner and landless tenant which that word signifies. The political instability of the last two decades is a reflection of the struggle now coming to a head between the laboring classes, especially the rotos, and the conservative landowners, the traditional rulers of Chile. Underneath this struggle is population pressure—land hunger and the resultant demand for a more equitable distribution of the arable lands of the country.

The government which came into power in October of 1938 was undertaking an ambitious and costly program of agrarian reform, when the country was stricken with disaster. On January 24, 1939, a great earthquake devastated the cities of the southern part of Northern Middle Chile. The brunt of the destruction fell on Chillán and Concepción. In Chillán, a city of more than 40,000, only two or three buildings in the whole community remained standing. To undertake the necessary reconstruction the government has had to levy greatly increased taxes and the program of social reform has been retarded.

So within the geographic unity of the compact nucleus of Chile we find once again that the population is actually composed of diverse and uncoordinated elements. Social complexity underlies the apparently simple clustering of people in the center and underlies also the apparent unity that comes from strong central authority focusing on this one area all the political and economic interests of the distant territories. In this central region the density of population reached a static condition more than seventy years ago; and continued population increase has been absorbed in various other ways, notably on the frontier and, more recently, in the cities. But frontier and city have both introduced additional elements of diversity into the Chilean scene. Since the pioneer zone is now largely occupied, and no new frontier is available, the problems which arise from increasing population pressure within a restricted area can no longer be escaped. Political and social changes are inevitable if these diversities are to be reconciled, whether such changes are effected by the processes of orderly evolution or by popular revolt.

9

REPÚBLICA DEL PARAGUAY

Total area, 169,266 square miles

Total population, 1,000,000

Capital city, Asunción; population, 104,819

Trade per capita:

Imports: $8.50
Exports: $8.27

Unit of currency, peso ($1.63, gold content value)

Major commercial products in order of value:

cotton
quebracho extract
hides
beef extract
maté
canned meats
tobacco
oil of petit grain
wood

Railroad mileage, 713

(The above statistics are for the year 1938.)

THE PEOPLE

The Paraguayans, like the Chileans, are predominantly mestizo. Something like 97 per cent of them are descendants of the native Guarani Indians and of the Spanish colonists who established themselves around Asunción in the sixteenth century (Maps 4 and 5). Today only a few families are of unmixed European origin, and these live mostly in the capital city of Asunción; in the remote parts of the country a few scattered tribes of pure Indians have survived. The Negro element is negligible. Since 1870 a trickle of new European immigrants has added another element to the population—an element which is small numerically, but large in influence.

The Indians of Paraguay belong to the linguistic family known as Tupi-Guarani (Map 4). This linguistic family is thought to have originated in the Basin of the Río Paraguay, and to have spread from that center over a large part of South America east of the Andes. The Guarani had even invaded the Quechua country in the Front Ranges of eastern Bolivia and established themselves there before the arrival of the Spaniards. They make up most of the coastal people of Brazil, and even far in the interior of the Amazon, tribes which speak this same language are found. Before the arrival of the white men the Tupi-Guarani tribes practiced a shifting cultivation of maize and manioc, supplementing their diet with fish and game. Generally they were a friendly people, quite in contrast to their pugnacious brothers, the Abipones and the Puelche of Argentina or the Araucanians of Chile, or even the various other Indian groups of the Brazilian interior.

The Spanish Conquest

The establishment of a Spanish primary settlement center on the eastern side of South America had very different results from those which followed the founding of Lima (Map 5). In Peru the Spaniards thought for a time that they had discovered El Dorado; but no such wealth awaited the colonists who came to South America from the east. In 1536 an expedition under Pedro de Mendoza landed on the shore of the Plata and established a settlement which was called Buenos Aires. But the boundless grassy plains contained no wealth of gold and silver, and the nomadic warlike Indians were not disposed to be friendly. Nor could the Spaniards practice the kind of agriculture which, in the modern era, has turned this region into one of the world's leading sources of food.

To the sixteenth-century Spaniards the Argentine grassy plains were low in potential productivity. In spite of its strategic location near the mouth of the Plata, Buenos Aires lacked the qualifications in terms of mines or large native populations which might have permitted it to become a primary settlement center. Shortly after its foundation, the colony was abandoned.

Meanwhile the Spaniards had pushed on up the Paraná, hoping to find a short route to Peru. In 1537 they had advanced far enough upstream to get beyond the savage Pampa tribes; and on the first bit of high ground which bordered the river within Guarani country, they founded the town of Asunción (Maps 4 and 5). As a route to Peru, however, the Paraguay-Paraná-Plata proved to be anything but satisfactory. Even to reach Asunción was such a difficult task through the maze of shifting and shallow channels that a later Spanish expedition was brought overland directly from the east coast of what is now Brazil. Asunción was isolated; but in the territory which has since become the nucleus of Paraguay, the productivity of the land and the numerous native population of friendly and adjustable Guarani offered the conditions necessary for the establishment of a Spanish feudal society.

Asunción became a primary settlement center. Lacking any source of wealth comparable with that which made Lima one of the wonders of the sixteenth-century world, this inland town of Asunción nevertheless played the part of a nucleus of Spanish settlement from which the Spanish occupation of southeastern South America radiated. Colonists advanced northwestward across the Chaco to found the town of Santa Cruz not far from the eastern base of the Andes. Settlements were spread also toward the east; and the final successful establishment of Spanish colonies on the margins of the Argentine grassy plains was accomplished by people who descended the Paraguay-Paraná-Plata from Asunción. Santa Fé was one of these colonies, founded in 1573; in 1580 the site of Buenos Aires was reoccupied.

Present Population

Few Spanish re-enforcements came to Paraguay after the early expeditions of the sixteenth century. As a result, the Guarani contribution to the Paraguayan mixture is a relatively large one—not only of blood, but also of language and ways of living. To the European eye, however, the Paraguayan mestizo is by no means displeasing; for his complexion is lighter than that of the mestizo produced by the mating of Spaniards and

the highland Indians of the Andes, and his features are not so harsh. The Guarani language is still the popular language of Paraguay, and many of the place names throughout this part of South America, including the southern part of Brazil, are Tupi or Guarani words.

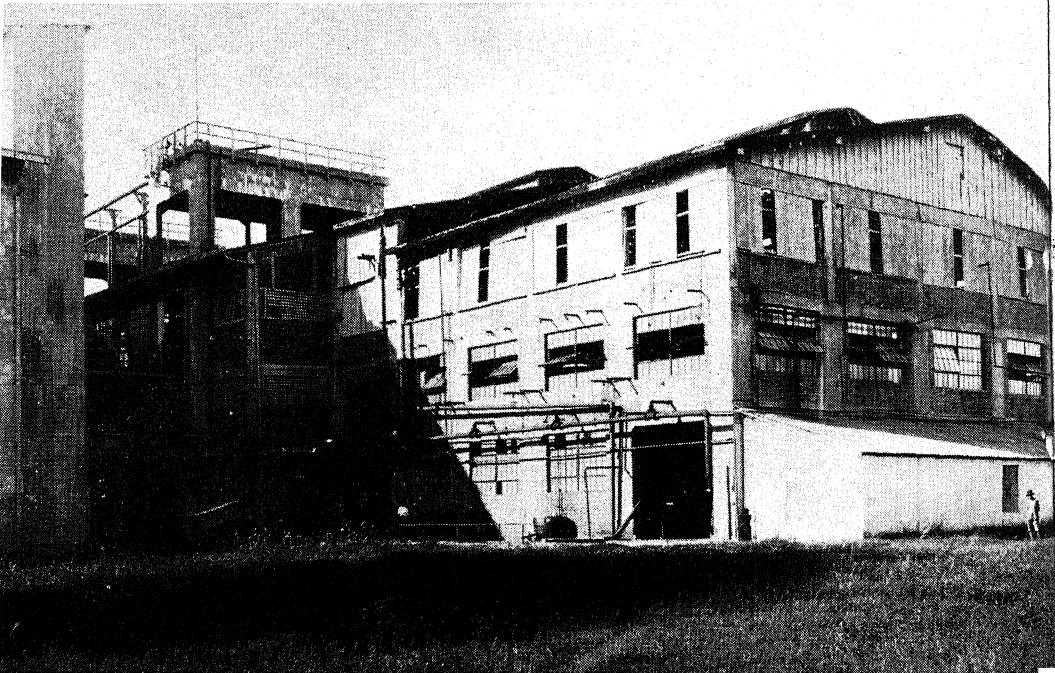
A third element of the Paraguayan population of today is made up of European immigrants who entered the country after 1870. The number is small, for most of the Europeans who came to South America during this period settled in Argentina or Brazil. But a few families of Italians, French, Spaniards, English, and Germans found their way to Asunción and settled there, intermarrying with the Paraguayans. At the present time the influence of this group in the economic, political, and social life of the country is of much greater importance than their numbers would suggest.

THE LAND

The Paraguayans live in a natural paradise. They enjoy the comfort of a mild climate, yet one which is not lacking in the stimulating effects of moderate weather change. They have an adequate supply of good soil for agricultural use. They possess forests and grasslands. Their country is neither monotonously flat nor sharply separated into contrasting extremes of mountain and plain. To be sure, the Paraguayans lack minerals; but perhaps mineral resources are not to be considered essential to a paradise.

The whole eastern third of Paraguay is an elevated plateau varying from one to two thousand feet in altitude (Map 48). This is the western part of the great *Paraná Plateau*, a land composed of successive flows of dark-colored lava interbedded with layers of red sandstone (Map 6). From the central part of the state of Rio Grande do Sul in southern Brazil the southern and western edge of the plateau forms a commanding scarp or cuesta, cliffed at the top. It crosses the Río Paraná near Posadas and Encarnación, and continues far northward across Paraguay and the Brazilian state of Mato Grosso. The Paraná, which flows southward through the center of the plateau, drops over the great Guayra Falls located where the northern border of Paraguay reaches the river. From the Guayra Falls to the place where the Paraná emerges from the plateau near Posadas and Encarnación the river flows in a deep canyon cut through the lava flows. This canyon forms the eastern border of Paraguay.

West of the cliffed edge of the Paraná Plateau in Paraguay there are low, flat plains, generally inundated at high water, interrupted in two places by "peninsulas" of crystalline hills. The ancient crystalline

The upper picture is of Asunción, capital of Paraguay. In the foreground are seen some of the one-story houses with interior *patios* so common in the residence district. In the distance is the Río Paraguay, bordered by low hills (Map 48). It was these hills, which made landing easy, that first attracted the Spaniards to this site. (Photo from Ewing Galloway.) The photograph below is of the market in Asunción where a variety of foods, baskets, and other articles are on display. Those long vegetables just in front of the basket are manioc roots. (Photo by James Sawders.)

The Río Paraguay-Paraná-Plata, owing to a winding, shifting channel, is not navigable beyond Santa Fé (see Map 48). The boats seen on the river front at Asunción (*above*) are river boats; and even these are too large for the trip farther north to Corumbá, Brazil. Asunción is, therefore, a point of transshipment, and generally presents a busy scene. (Photo from Ewing Galloway.) An important shipment down the Paraguay to Buenos Aires is quebracho extract.

rocks which form the basement complex of the Brazilian Highlands are deeply buried beneath the lava flows of the Paraná Plateau, but they emerge to the west to produce a country strikingly different from the plateau. Granites and gneisses in warm, wet climates are much more rapidly decomposed than are the lava flows or the sandstones. Instead of the sharp features of the plateau, with its notably tabular profiles and its steep-sided canyons, the crystalline hilly uplands to the west are gently rounded in profile and of relatively slight relief. One of the peninsulas of crystalline hills extends northwestward to the Río Paraguay north of Concepción, even forming a few isolated mounds west of the river; the other peninsula reaches the left bank of the Paraguay at the site of Asunción. The central area of concentrated settlement in Paraguay is located on the belt of crystalline hills between Encarnación and Asunción.

The remainder of western Paraguay is composed of a lowland plain, much of it subject to annual floods. Between the two peninsulas of crystalline hills two great bays of lowland bend far to the east of the Río Paraguay. One of these lies south of Concepción; the other forms a triangle of low country in the southwest, bordered along the northeast side by the hilly country of central Paraguay, and on the other two sides by the Paraguay and Paraná rivers. Along the immediate riverbanks there are natural levees sufficiently elevated to stand above all but the highest floods; but back of these narrow strips the back marshes are filled with stagnant water during the rainy season, and drain out only during the dry part of the year.

West of the Paraguay lies that vast alluvial plain known as the Gran Chaco—a region composed of unconsolidated sands and clays brought from the wasting Andes by the great rivers. The Río Pilcomayo, which forms the northern border of Argentina, and the Río Bermejo cross this plain with winding, shifting courses. Their braided channels change in pattern after each flood season, leaving additional complications in the already intricate pattern of crescent-shaped swamps and abandoned levees. Except for these two rivers the Chaco is drained imperfectly by many small channels leading toward the Paraguay.

Vegetation and Climate

The natural cover of vegetation in Paraguay, as in other parts of the world, shows a general correspondence to the pattern of the climatic conditions, but conforms in detail with the pattern of the surface and soil (Map 49). Since the rainfall is highest on the Paraná Plateau and diminishes toward the west, the vegetation cover is densest in the east,

THE CHACO AND PARAGUAY
SURFACE CONFIGURATION
PLAINS
PLATEAUS
HILLY UPLANDS
ANDES
CUESTAS
58°
16°
20°
24°
28°
32°
62°
54°
CUIABÁ
BRAZIL
BOLIVIA
RIO MAMORÉ
SANTA CRUZ
SUCRE
CORUMBÁ
CAMPO GRANDE
VILLA MONTES
TARIJA
PARAGUAY
ARGENTINA
RIO PILCOMAYO
RIO BERMEJO
CONCEPCIÓN
RIO PARAGUAY
GUAYRA FALLS
IGUASSÚ FALLS
ASUNCIÓN
PARAGUARÍ
VILLA RICA
FORMOSA
TUCUMÁN
RESISTENCIA
CORRIENTES
ENCARNACIÓN
POSADAS
SANTIAGO DEL ESTERO
RIO SALADO
RIO DULCE
RIO PARANÁ
RIO URUGUAY
URUGUAIANA
URUGUAY
MAR CHIQUITA
CÓRDOBA
SANTA FE
PARANÁ
SALTO
ROSARIO
SCALE
0
200
MILES

MAP 48

THE CHACO AND PARAGUAY
NATURAL VEGETATION
58°
16°
16°
20°
20°
24°
24°
28°
28°
32°
0 SCALE 200
MILES 62°
58°
XEROPHYTIC SHRUB
PUNA
MONTE
MONTE-PRAIRIE TRANSITION
PRAIRIE
SCRUB-PRAIRIE TRANSITION
SCRUB FOREST
SAVANNA
SELVA
MOUNTAIN FOREST
SEMIDECIDUOUS FOREST
ARAUCARIA FOREST
MOUNTAIN FRONT
54°

Map 49

and thins out westward. Asunción has an average annual rainfall of a little over 50 inches, which, in these latitudes, is moderate.

Semideciduous forests, reflecting this abundance of rain, cover the eastern part of Paraguay. They are composed of tall broadleaf trees; some of the species are evergreen and some deciduous. The forest is densest in the moist valleys of the plateau, and thins out on the red sandy soils of the crystalline hilly belts. The lava soils, too, support a relatively dense tree growth, but sandy soils on the plateau, where the red sandstones come to the surface, are marked by patches of scrub forest and palm.

Between the forest and the Río Paraguay, in the zone of marshy lowland, the vegetation is composed of wet savanna. Tall grasses without trees grow in the back marshes, but each stream is followed along its banks by a dense screen of galeria forest.

Very different are the scrub forests of the Chaco on the western side of the Paraguay. Grassy plains with scattered clumps of palms occupy the zone nearest the river, but toward the west the vegetation becomes more and more xerophytic—a reflection not only of decreasing rainfall but also of the porous nature of the alluvial soil. Over much of the Chaco there is an actual scarcity of running water, and during the long winter dry season many patches of alkali make their appearance. The lush green vegetation of the banks of the Paraguay is replaced toward the west by alternating thickets of thorny, deciduous scrub trees and openings of coarse grasses. One of the chief species of the scrub forest is the quebracho (*Quebrachia lorentzii*), a tree valuable as a source of tannin.

These features of surface, soil, and natural cover of vegetation are combined in a land which is on the margins of the tropics. Paraguay bears many climatic resemblances to southern Florida. Average monthly temperatures at Asunción (ranging from 62.6° to 80.4°) are similar to those of Miami. As in Florida, moreover, there is a considerable variety of weather produced by the alternation of air masses of polar and tropical origin. Unlike Florida, however, Paraguay never feels the destructive violence of hurricanes. Paradise indeed—for a people who wish to live comfortably and do not dream of great riches.

THE COURSE OF SETTLEMENT

At first it looked as if the settlers of Paraguay might succeed in creating a paradise. After the establishment of the nucleus of Spanish colonization around Asunción the first penetration of the southern and eastern

part of the country began in 1609 with the arrival of the Jesuit missionaries. The scattered and shifting tribes of Guarani Indians were gathered together around the missions and were taught to adopt a sedentary way of living. Thirty-two Jesuit missions were established in Paraguay east of the Río Paraguay. For the Indians the new way of living based on farming, cattle raising, and the collection of forest products meant a more adequate and varied diet and greater security from famine. Unfortunately, however, the Jesuits could not maintain their isolation. Little by little they began to produce goods for sale outside of their small communities, eventually even trading their wines and tobaccos in the distant settlements along the eastern front of the Andes. This economic expansion brought the Jesuits into conflict with the large landowners who wanted both the profits of commercial enterprise and the assistance of the Indian workers. In 1767 the Jesuits were expelled and, for the Indians, paradise was lost. The mission communities fell apart. Those in the outlying sections of the country were entirely abandoned as the Indians drifted toward the central area around Asunción. The natives, unwilling to return to their former way of living, were speedily attached to the large estates through a system of debt bondage—in other words they were reduced to a state of peonage. The result was the depopulation of the outlying districts and the increase of population in the center.

The War with Brazil, Argentina, and Uruguay

The first of the wars which brought poverty to Paraguay was fought during the years from 1865 to 1870. Three powerful leaders had controlled the destiny of Paraguay during the period after independence from Spain. These leaders had developed a spirit of aggressive nationalism among the people, and the last of the three had trained one of the most effective armies in South America. The Paraguayans came to believe that their only hope for independent national existence lay in gaining access directly to the sea, by territorial conquest if necessary. In the resulting war the countries allied against Paraguay—Brazil, Argentina, and Uruguay—required five years to defeat the strong armies of the inland state. During those five years at least 225,000 Paraguayans lost their lives either in battle or by disease and starvation. A total population in 1865 of about 525,000 was reduced by 1870 to something like 300,000; and of these only about 22,000 were males (100).

From this crushing disaster Paraguay struggled slowly back, aided not little by the European immigrants who brought new hope to a tired

people. By 1912 the population was estimated to be about a million, and the ratio between the sexes was nearly normal again.

Paraguayan Products and the Problems of Transportation

Difficulty of access remains a major handicap for Paraguayans who wish to buy and sell in foreign markets. The river has never offered an easy solution to the problem. Its braided channel is subject to frequent shifts of position, and winds about to such a degree that many miles of sailing are required to cover only a short distance in a direct line. Settlements located on the banks of the main channel are left without access to the river when the channel shifts to another part of the floodplain; or sand bars are formed which make the river too shallow for navigation at the landing places. The main channel touches the base of higher ground not subject to flood at only a very few spots—notably at Santa Fé in Argentina and at Asunción (Map 48). Modern, ocean-going steamers can ascend the river only as far as Santa Fé, and encounter much difficulty above Rosario. The fact is that the Paraguay-Paraná-Plata is such a poor river for navigation that even in the days before railroads, Paraguay's chief connection with Buenos Aires was by road.

The construction of railroads has not solved the problem of accessibility for the Paraguayans. In 1913, Asunción was given a rail connection with Buenos Aires, but rates have remained high because of the expense of construction and the small volume of traffic. Bridges over the river cannot be built because the treaty which concluded the Paraguayan War made this waterway international and prohibited the construction of potential barriers across it. But even if no such restrictions had been imposed, the engineering difficulties involved in building bridge piers in the loose floodplain deposits would have made the costs prohibitive. The trains which run between Asunción and Buenos Aires are carried across the Paraná between Encarnación and Posadas by ferry; another ferry carries them through the maze of channels across the lower river a short distance west of Buenos Aires (Maps 50 and 62). A recent report states that the cost of shipping goods to Asunción from Buenos Aires is about equal to the cost of shipping them to Yokohama.

Nevertheless, in spite of these difficulties, certain products are capable of supporting the high costs of transportation and reach the outside markets. Cattle and cattle products form the most regular items of Paraguayan commerce. But in some years certain other commodities are exported, and may even exceed cattle exports in value. One of these is quebracho extract, prepared in small portable mills in the forests along

the Paraguay-Paraná, most of which mills are owned by Argentines. Another product is yerba maté, or Paraguay Tea. This beverage, widely used throughout southern Brazil, Uruguay, and Argentina, is made from the leaves of the *ilex paraguayensis*, a species of South American holly which grows chiefly in the forests of the Paraná Plateau. Agricultural products grown on the estates in the area of concentrated settlement are sometimes sufficiently valuable to pay for export—products such as cotton and tobacco.

The Chaco

Most of the Paraguayan people and most of the Paraguayan commercial production are concentrated on the eastern side of the Paraguay-Paraná-Plata. The Chaco, which lies west of the river, is a world apart. As far as physical conditions are concerned, this great alluvial plain between the river and the base of the Andes bears a striking resemblance to the Ganges Valley of northern India. The climate of the two regions is similar; the scrub forest of both can be placed in the same general category of natural vegetation; and the similarity is increased by the presence in both regions of great sprawling rivers, subject to annual floods and frequent shifts of channel. Only in detail do the two pictures differ. But the one is densely populated—more than a thousand rice- and wheat-growing farmers per square mile; and the other is one of the larger areas of very sparse population in Latin America. The Chaco is divided among four states—Argentina, Paraguay, Bolivia, and Brazil; yet only a small proportion of it can be included in the effective national territory of any of them.

Strangely enough, the two states which would seem least likely to be able to occupy the Chaco effectively are the ones which have been contending for the control of it. Bolivia and Paraguay have each set forth abundantly documented legal arguments to support their claims to the territory north of the Argentine border and west of the Brazilian border. Between 1926 and 1931 the Paraguayans established about 35 villages of Russian Mennonites some 125 miles west of the Río Paraguay on land which the Bolivians also claimed. Meanwhile the Bolivians placed army detachments far to the east in territory which the Paraguayans claimed. Although the whole area remained largely a wilderness, with few trails and few places where boundaries were clearly marked, the Paraguayans and Bolivians both pushed forward their outposts. The Bolivians were being led to believe, as we have already reported, that the extension of political territory to the banks of the Paraguay would in some miraculous

THE CHACO AND PARAGUAY
LAND USE
LIVESTOCK RANCHING WITHOUT AGRICULTURE
LIVESTOCK RANCHING WITH AGR.-IRRIGATED
SHIFTING CULTIVATION
FOREST PRODUCTS
SEDENTARY SUBSISTENCE AGRICULTURE
SEDENTARY SUBSISTENCE AGR.-IRRIGATED
WHEAT
MAIZE
YERBA MATÉ
SUGAR-IRRIGATED
COTTON
PETROLEUM
MANGANESE
58°
16°
20°
20°
24°
24°
28°
28°
32°
32°
62°
58°
0
SCALE
200
MILES

MAP 50

THE CHACO AND PARAGUAY
POPULATION
URBAN
MORE THAN 100,000
LESS THAN 100,000
RURAL
EACH DOT 1,000
BOLIVIA
P. POTOSÍ
URUGUAY
A. ARTIGAS
R.N. RIO NEGRO
D. DURAZNO
PAY. PAYSANDÚ
C.L. CERRO LARGO
R. RIVERA
T. TACUAREMBO
PARAGUAY
V. VILLETA
Q. QUIINDI
S.I. SAN IGNACIO
C. CARAGUATAY
SCALE
0
200
MILES
BENI
COCHABAMBA
SANTA CRUZ
MATO GROSSO
CHUQUISACA
TARIJA
BOLIVIA
ARGENTINA
BRAZIL
PARAGUAY
CONCEPCIÓN
SALTA
FORMOSA
SAN PEDRO
YHU
PARANÁ
ENCARNACIÓN
SANTIAGO DEL ESTERO
CHACO
PILAR
CORRIENTES
MISIONES
RIO GRANDE DO SUL
SANTA FÉ
CÓRDOBA
ENTRE RÍOS
SALTO
PAY.
R.N.
D.
R.
T.
C.L.
A.
62°
58°
54°
16°
20°
24°
28°
32°

Map 51

fashion solve the problem of isolation. The Paraguayans were no doubt motivated to a certain degree by the strong hope that oil would prove to be available not only along the Andean front, but also in the plains east of the mountains. From 1932 to 1935 the two countries were locked in a death struggle: each of them, already burdened with debt, contracted new debts to pay the huge cost of armaments. In the United States much comment was aroused at the time by the fact that so little difficulty was experienced in financing these armaments, even in the case of two countries so obviously bankrupt. In our complicated international system of commerce it is not always clear who will eventually stand the losses which inevitably follow from such loans. The war was concluded in 1935 only because both sides were literally exhausted. A new boundary was drawn approximately along the battle front as it was at the time of the armistice—it represented a considerable gain for Paraguay, but left the known oil fields in the hands of Bolivia.

The tragedy of this conflict resides in no small part in its futility. That Bolivia would find access to the outside world an easier matter if its boundaries extended to the Paraguay is an error; not only because of the essentially inland position of Bolivia's nucleus of settlement (as set forth in the section on Bolivia), but also because of the nature of the river itself. Nor could anything be more futile than to hope that the speculative development of an oil field would relieve the burdens of debt and poverty. Few countries find themselves in the position of Venezuela, ready to concentrate the oil revenues in the hands of one powerful leader. Nor can either Bolivia or Paraguay provide the man power necessary for the agricultural or pastoral settlement of the Chaco. Neither of these countries has centers of expanding population, and neither of them has gained significantly in population through immigration. When and if settlement of the Chaco is made, it is far more likely to be made either by Argentina or Brazil. The present uncertainty enveloping the question of control of the Chaco, and the rival expectations for profit from the wealth of oil which is undoubtedly there waiting to be exploited, must be recognized as a danger to the peace and international harmony of the South American countries, especially Argentina and Brazil.

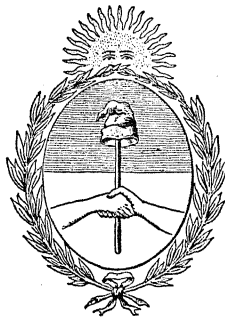
PARAGUAY TODAY

There are between 800,000 and 1,000,000 people in Paraguay today. Fortunately the mildness of the climate and the productivity of the land decreases the severity of the burden of poverty under which the country

staggers. Living standards, except for a handful of wealthy people, are very low: skilled laborers receive something like $1.50 a day—unskilled laborers less than a dollar; even city workers are in many cases permanently in debt to their employers. Illiteracy is estimated at 75 per cent of the population, and disease and malnutrition are widespread. The apathy of the masses of the people toward these living standards is born of long experience with such standards. Even the land itself is not regarded with the sentimental attachment common in many agricultural countries—people move easily from one estate to another, or from the country into the city, leaving without regret their miserable homes of mud and thatch. In the whole country the amount of cropland is remarkably small—less than one half of 1 per cent. A variety of crops is grown, including maize, manioc, potatoes, beans, rice, sugar cane, oranges, cotton, and tobacco. In recent years the exports have consisted chiefly of cotton, quebracho, cattle products, maté, tobacco, and wood. The oranges of Paraguay, which have an especially fine flavor, cannot stand the costs and delays of shipment, but from the orange leaves petitgrain oil, used in the manufacture of perfumes, is extracted and exported.

So while the Paraguayan people are burdened with poverty, the Paraguayan land goes on offering bounteous crops and a rich store of forest products. If the funds spent on armaments could have been spent on more productive ends, real economic values might have been created which would have brought prosperity to Paraguay, even if this country never was able to sink one productive oil well. The Paraguayan landscape, with its rolling hills, its rich green pastures, its waving palms, is still a pleasant one: except for the ambitions of some of its rulers Paraguay could have been a paradise.

10

REPÚBLICA ARGENTINA

Total area, 1,079,965 square miles

Total population, 13,129,723

Capital city, Buenos Aires; population, 3,114,000 (for Greater Buenos Aires)

Trade per capita:

- Imports: $27.60
- Exports: $27.99

Unit of currency, peso ($1.63, gold content value)

Major commercial products in order of value:

meats	quebracho extract
wheat and flour	oats
linseed	barley
maize	dairy products
wool	cotton
hides	

Railroad mileage, 26,564 (1939)

(The above statistics except when noted are for the year 1938.)

10

ARGENTINA

ON A CONTINENT where the rural life is predominant, Argentina is notable for the dominance of its big cities. In this country there are growing concentrations of urban people in the midst of areas of declining rural population—a characteristic which it shares with the United Kingdom, the United States, Germany, and other industrial nations. In 1939, approximately two thirds of the population was in cities of more than one hundred thousand; and nearly a quarter of all the Argentines were living in the huge metropolitan concentration of "Greater Buenos Aires."

Argentina is a new country, a product of the late nineteenth century and of the present century, thoroughly modern in its outlook and in the nature of the problems it has to face. In the colonial period Argentina was only a "poor relation" of Peru. Remote from the centers of Spanish colonial activity, the plains of Argentina were used for the production of mules and cattle, which were sent northward over the long trail to the centers of economic activity in the Andes. No dense Indian populations and no great wealth of silver and gold lured the Spanish pioneers into the boundless grasslands, or the wind-swept deserts of the south. But when modern Argentina was born in 1853, and when the first railroad was built in 1857, the first steps were taken in that sequence of changes which established the hinterland of Buenos Aires as one of the chief grain- and meat-producing regions of the world and the leading region of all Latin America in terms of commercial activity.

Expanding Economy in the Occidental World

The settlement of the Argentine grasslands was a part of a world-wide movement which characterized the period from the middle of the nineteenth century to the First World War. In North America this same period witnessed the settlement of the grasslands of the United States and Canada, and also the rise of the United States to its position as a world power. In Europe, around the shores of the North Sea, and in eastern North America, the development of mechanical devices for the use of controlled inanimate power and the rapid evolution of the industrial society were accompanied by the rise of great concentrations of people in cities—of people who were engaged in commerce, manufacturing, and other urban pursuits, but who were not producing their own food. Never before in the history of mankind had there been such great concentrations of people in cities. As the urban population of the Occidental world multiplied, the demand for more and more agricultural and pastoral products became insistent; and this demand was paralleled by the spectacular increase in the need for raw materials and fuel for the supply of the new machines. As the great cities began to develop, the urban people were forced to reach out to more and more distant places for their sources of food and raw materials; and in the process of reaching out they diversified and enormously amplified the materials which were built into their civilization. The new machines used for transportation decreased the cost of moving bulky and perishable products over great distances of land or water.

As the railroads penetrated the grasslands of the world, these formerly remote places were given entirely new economic opportunities. Agricultural settlers removed the sod and planted more and more of the land in crops, gradually forcing out the seminomadic cattlemen who had previously held undisputed control over the open ranges. The surplus grain and the meat from animals fattened on cultivated feed crops were sent back to the city markets; and the city people, in turn, found an important outlet for their products in the pioneer settlements of the grassland frontiers. Both movements—the expansion of the agricultural frontier and the elaboration of the manufacturing industries—went on together at a faster and faster pace. As settlement in the grasslands proceeded, the farm values made spectacular gains. In North America the construction of railroads and even the cultivation of crops by machinery proved exceptionally profitable because of this increase in land values—the so-called "unearned increment."

Occidental people, however, were puzzled by recurring financial crises. The condition was blamed variously on government, on foreign influences, or on the bankers. The truth is only beginning to be recognized that what people thought was a normal course of economic development was, in reality, a unique experience in the long history of mankind. The time came when there was no more first-class land available for free distribution, no more frontier of new settlement with its opportunities for quick wealth. Some agricultural areas experienced a rapid decline in population, and the urban industrial plants, geared to the supply of a constantly expanding market, were faced with financial ruin. The First World War brought further complications, including a general raising of tariff barriers and a return to ideas of local economic self-sufficiency. While the land was becoming more and more productive through the advance of farm techniques, millions of urban people could not purchase the products of the farming people: the whole economic system was faced with disaster.

This sequence of events, so well known to North Americans, is also well known to the people of Argentina. Yet Argentine experience in certain fundamental ways differs notably from that of people in the United States and Canada. There is no such financial problem in Argentina's chief agricultural region as now troubles the farmers of North America, for most of Argentina's farm products are raised by tenant workers who occupy the land only temporarily. Decreasing prices lead to the easy shift of workers from rural districts to the cities or to agricultural colonies, while the financial losses are absorbed by a minority of wealthy landowners. There is no "problem area" on the dry margin of Argentina's wheat lands comparable to that of the North American "dust bowl," for the system of large estates and tenant workers permits the flexible adjustment of the agricultural frontier to the price fluctuations. And, before the outbreak of the Second World War, there was in the cities no major crisis of unemployment comparable to that which faced the people of North America, because Argentina had only just entered the stage of building its own manufacturing industries, and there was still a demand for urban labor in this new construction.

And there is another way in which Argentina differs fundamentally from the United States. In Argentina there is no region which corresponds to that part of the United States lying east of Chicago. The relatively low cost of agricultural production in Argentina is the result in part of exceptionally favorable soils and climate, in part of the low cost of labor, and in part of the location of the region on the borders of the

ocean. But because of the lack of an urban-industrial east, comparable to the highly industrialized eastern section of the United States, the Argentine economy is inevitably tied to overseas markets. In times of financial and political stability in the international world, this is a great advantage; but in times of chaos, like the present period, Argentina's advantage turns to a disadvantage, leading to economic uncertainty and insecurity. And the development of the domestic market in Argentina is a matter of very great difficulty, for this country is poorly endowed with the resources of minerals and power which are essential to the support of a strong domestic economy. We can understand these problems better if we look more closely at the arrangement of the centers of population and their relation to the land.

Major Physical Divisions of Argentina

The Argentine national territory includes a wide variety of kinds of country (Maps 6 and 7). Argentine geographers recognize four major physical divisions, each with numerous subdivisions (104, 108, and 114). Except in the far south, the western border of the country is in the Andes. The first major division of the country, the *Andes*, includes the cordilleras from the dry north to the heavily glaciated and ice-covered mountains of Patagonia. It includes also the very dry southern part of the Bolivian Altiplano, and the lower, but also very dry mountain-and-bolson desert west of Córdoba and south of Tucumán (Map 52). The eastern piedmont of the Andes with its succession of oasis settlements may be included with this first major division of the country.

The second major division is the *North*—a region which comprises the three chief kinds of land already described for Paraguay. There is the vast alluvial plain of the *Chaco*, with its tropical scrub-forest cover. On the east and south of the Río Paraná there is Argentine *Mesopotamia*, the land between the rivers (the Paraná and the Uruguay), composed partly of floodplain, partly of gently rolling and well-drained interfluves. In the far northeast there is an arm of Argentine territory which extends onto the *Paraná Plateau*.

The third major division of the country is the *Pampas*—the great plains which lie south of the Chaco and east of the Andean piedmont. Most of these plains were originally covered with a growth of low scrubby trees and grasses, a vegetation type known as *monte;* but toward the southeast of the Pampas, where the rainfall is heavier and the summers remain cool (Map 10), tall prairie grasses were once probably more impor-

tant than the monte. It is customary to divide the Pampas into a wetter eastern part and a drier western part—designated respectively as the Humid Pampa and the Dry Pampa. When the Argentines refer to *La Pampa*, they are referring to the territory of that name which lies mostly within the Dry Pampa.

Finally, the fourth major physical division of Argentina is *Patagonia*, the region south of the Río Colorado. This is a land of arid, wind-swept plateaus, crossed at wide intervals by strips of green vegetation along the valley bottoms. In the far south of Patagonia Argentina shares with Chile the land of continuously cool and stormy weather, where winters are never severe, but where there is never any summer.

THE PEOPLE OF ARGENTINA

Against this diverse background ranging from lofty mountains to vast plains, from regions of extreme drought to regions of abundant moisture, and from continuously cold and stormy lands to lands which, like Paraguay, border on the tropics, the Argentine people have distributed themselves in a pattern which is notably uneven and diverse in character (Maps 1 and 2). Two chief population zones can be described: there is the string of oasis settlements along the eastern piedmont of the Andes, focusing chiefly on Tucumán, Mendoza, and Córdoba; and there is the larger and entirely different concentration on the Humid Pampa, focusing on Buenos Aires.

The degree to which the Argentine national life is concentrated in the immediate hinterland of Buenos Aires is extraordinary, especially when we understand that this concentration is a product of the last ninety years. Buenos Aires itself is not only the largest city of Argentina and the largest city in Latin America, but also it is the largest urban center of the Southern Hemisphere, and second only to Paris among the Latin cities of the world. The Humid Pampa makes up about 22 per cent of the total area of Argentina; yet in this one region there are some eight and a half million people, about 68 per cent of all the Argentines. In this region are nearly 70 per cent of all the railroads, 84 per cent of all the automobiles, 86 per cent of all the territory used for the production of cereal and flax, 63 per cent of all the cattle, and 85 per cent of all the industrial production. Argentine economists figure that in this one region is concentrated 82 per cent of the productive capacity of Argentina (113).

In proportion to the concentration of economic activity in this region the density of the rural population is surprisingly low. There are only a

few spots near Buenos Aires where the population exceeds 100 per square mile. The zone with densities between 25 and 60 per square mile extends westward from the capital city for only about 200 miles. Most of the Humid Pampa has a rural density of between 10 and 25 people per square mile. On the other hand, 82 per cent of the people in this region live in towns and cities, as defined by the Argentine writers; in this area there are 66 towns and cities of more than 10,000 inhabitants.

The other clusters of people in Argentina are quite different from the great cluster around Buenos Aires: the oasis settlements of the Andean piedmont represent a much older colonization, and a colonization which came from the north and west, from across the mountains, rather than from the east across the plains (Map 5).

Outside of the piedmont oases, and certain smaller concentrations in the North, the rest of Argentina is very sparsely settled. Nearly half of the national territory, in fact, is occupied by less than 8 per cent of the people: over vast areas there is a population density of scarcely two people per square mile. Amid such contrasts as these emerges the national unity of Argentina.

Racial Character and Origin of the Argentine People

The Argentine people are different from any of the Latin Americans we have discussed hitherto. Nearly 98 per cent of them are of unmixed European origin (110). In 1914 it was reported that 5.1 per cent were mestizo, that is, composed of the mixture of Spanish and Indian elements similar to those of Paraguay, Chile, or Bolivia. In 1930, however, the proportion of mestizos was only a little over 2 per cent. In the latter year about 74 per cent of the Argentines were native born of unmixed European parentage, and about 24 per cent were born in Europe. The number of pure Indians within the national borders is almost negligible, being estimated at present as between twenty and thirty thousand. The Negro element is also negligible.

These general figures, however, like most statistics generalized for a country as large and as varied as Argentina, conceal certain important geographic differences. The central area comprising the immediate hinterland of Buenos Aires, with more than two thirds of the present population, is not only exclusively peopled by Europeans, but by Europeans of recent origin—made up mostly of families who have arrived in Argentina since 1853. The population of the rest of Argentina is not so very different from that of the neighboring countries. The small per-

centage of mestizos for the nation as a whole is increased to a figure comparable with that of Chile (between 50 and 75 per cent) when the populations of the Andean piedmont of the northwest alone are considered. Among the very sparse populations of the highlands, especially in the northwest, there are pure-Indian communities similar to those of Highland Bolivia, from which, indeed, they are to be distinguished only by the color of the flag which is raised on school buildings. The overwhelming importance of the central area of the country, in terms of numbers of people and also of economic and political power, should not obscure the fact that the larger part of the Argentine national territory is occupied by a people with very different racial and historical background.

The outlying parts of the national territory were mostly settled by people who had come from Peru, Paraguay, or Chile, not from Buenos Aires (Map 5). Even the beginnings of permanent colonization on the borders of the Humid Pampa came from the primary settlement center of Asunción. We have already noted that after the first disastrous attempt to establish a foothold on the Plata shore in 1536, the remnants of the colony were removed upstream to what is now Paraguay. Asunción became a kernel of European culture from which the newcomers spread over much of the surrounding territory. Corrientes, Santa Fé, and Buenos Aires (1580) were established by people from Asunción.

Meanwhile, however, the Northwest of Argentina was being occupied by people who came either directly or indirectly from the other great Spanish culture center, Lima. The chief route of settlement followed the old Inca road to the southeastern outpost of the Inca Empire, near Tucumán. Since the early route to Chile avoided the Atacama and the high Puna country by making a long circuit to the east and then crossing the single range of the Andes south of latitude 28° S., this eastern piedmont of the highlands was intimately connected with the settlement of Chile during the sixteenth century. The first Spanish stronghold, and the center from which other colonies in this region were established, was Santiago del Estero (Map 52), founded by people who returned from Middle Chile in 1551 and 1553. From this center other settlements were made at Tucumán (1565), Córdoba (1573), Salta (1582), La Rioja (1591), and Jujuy (1592). The eastern piedmont settlements farther to the south were settled also by people who came across the mountains from Chile: Mendoza (1561–1562); San Juan (1562); and San Luis (1598). A strong current of immigrants from Chile in more recent times has supplemented the population of the Argentine oases from Mendoza to Neuquén (Map 56), and people of Chilean origin are the chief settlers

of the eastern Andean border in southern Patagonia. The reasons for this outward movement of Chileans during the nineteenth century have already been discussed: its result was the development in this part of Argentina of a population of mestizo character, with a background of tradition quite different from that of the inhabitants of modern Buenos Aires.

The people of all the early settlements had trouble with the nomadic Indians of the Argentine plains (Map 4). The Abipones, the Puelche, and the other tribes of the Pampas and Patagonia, although not numerous, were independent and warlike. They resisted the invasion of the Spaniards as they had that of the Incas. These migratory hunters of the guanaco and the rhea never could be tamed for agricultural labor as the Guarani had been tamed. If they lacked the shelter of the forests that their brothers, the Araucanians, enjoyed, they nevertheless were more than a match for the Spaniards on the arid or semiarid plains and plateaus where knowledge of the water sources was of primary importance. The adoption of horses and firearms by these Indians had much the same effect as on the Indians of the Great Plains of North America. Greatly increased mobility and capacity to kill the wild game was a temporary advantage; but the exhaustion of the wild animals made the Indians even more warlike in their struggle for wider hunting grounds. Until the last quarter of the nineteenth century a line of forts across the Humid Pampa barely held the weak barrier of the Río Salado; they provided a quite inadequate protection for the settlements along the Paraná-Plata shores and the route to Córdoba (Map 64). As late as 1876 it was estimated that something like 40,000 head of cattle were stolen every year in Indian raids—many of them being sold in Chile. With the campaign of 1879–1883, however, the Indians were pushed back and the line of forts was extended to include more and more of the grassy plains (Map 65). Not until the year 1880 was the settlement of Bahía Blanca, at the southern margin of the Humid Pampa, connected by land with the towns to the north and west. But the Indian days are now gone, and only on reservations in the more remote and unattractive regions can pure-native peoples be seen today.

During the colonial period the piedmont settlements of the northwest and west belonged to a different world. They were connected economically with the West Coast. At Salta a fair was held each year at which mules and cattle from the grassy plains were sold to the mining peoples of the Andes. But the seminomadic *gauchos* of the plains or the inhabitants of the small Plata ports had little real contact with the inhabitants of the piedmont oases.

The story of the rapid increase of European immigration after the middle of the nineteenth century, the spread of railroads and agriculture, the growth of Buenos Aires, is a story which belongs properly to the discussion of the settlements of the Humid Pampa. Its effect has been to create a new and quite different kind of population, moved by different purposes, and achieving a very different way of living from that of the older piedmont settlements. But the latter have not been left untouched. They have been reoriented economically, and now come definitely within the influence of Buenos Aires; they maintain no more than a mere trickle of commerce with the countries on the other side of the mountains. Tucumán and Mendoza, too, have received a considerable current of immigration, in part composed of people from other Argentine provinces. Today the long struggle between these contrasted portions of Argentina for economic domination is at an end, even if there are still some remains of the contest in the political field. Buenos Aires is at the present time the focus of everything Argentine.

Regions of Argentina.—These various currents of settlement, which brought not only changes in the character of the population, but also changes in the relationships between the people and the land, had the effect of developing and diversifying the regions of Argentina. Some of the most distinctive divisions of the country, and some which are commonly described as "natural" regions, have in reality been given their marked individuality by the selective process of human settlement. The Humid Pampa, for example, was not a region of definite personality to the Indian whose wild game made little distinction between what we call "humid" and "semiarid." Nor did the herders of the scrub cattle and mules of the colonial period find any sharply defined line between the monte and the tall bunch grasses. The western margin of the Humid Pampa was not a conspicuous feature until grain farming made it so. In fact our concept of the terms "humid" and "semiarid" is based fundamentally on the needs of Occidental wheat farming under the economic system of the late nineteenth century. The Humid Pampa has been "developed" as a result of the last ninety years of settlement, and the Argentine geographers are quite justified in not regarding it in its present outlines as a major natural region.

The popular consciousness of regions is the product of many generations of experience. In pioneer lands the settlers seldom are aware of the regional divisions which the geographer describes to them. Because pioneer settlement by Occidental peoples is so closely tied to the lines of transportation, the divisions of a frontier territory commonly recognized

by the settlers themselves are the areas served by the different routes of access. The people living in the Argentine Humid Pampa still think of themselves as in the zone of this or that railroad line; to this day popular consciousness of the unity of the Humid Pampa has not proceeded far enough to bring into common use any proper name for it.

The regions of Argentina as they have been developed by the activities of the inhabitants are all focused on that nucleus of the country, the Humid Pampa, and its great urban center, Buenos Aires. Until after 1853, however, the Humid Pampa played a subordinate role, and the outlying portions of the country—the Northwest, Mesopotamia, the Chaco, and Patagonia—all had most of their connections with foreign countries. Little by little the domination of Buenos Aires has been extended to more and more remote places. Contact with this growing urban center meant the possibility of selling in an expanding market; but, in each case, recent years have revealed that such contact also leads inevitably to economic vulnerability in time of financial depression. Before turning to the central region itself, let us consider the parts of Argentina which surround it.

THE NORTHWEST

No physical change distinguishes Bolivia from the Northwest of Argentina. The same natural divisions of the land are found on either side of the border: from west to east one proceeds from the Altiplano with its dry intermont basins, across the undissected Puna, across the eastern margin of the Puna where the east-flowing streams have cut deep valleys, across the zone of the Front Ranges, and finally to the Chaco. Puna and Altiplano together in northern Argentina are approximately two hundred and fifty miles wide, standing between eleven and thirteen thousand feet above sea level. Above the Puna surface there are isolated ranges, some of which reach elevations of more than nineteen thousand feet; and especially along the eastern margin, the Puna surface has been cut by streams—here the commanding east-facing front of the Puna is breached at several places by broad valleys, or *quebradas*, which offer relatively easy routes of access to the high country beyond. Between the eastern front of the Puna and the western margin of the Chaco there is a zone of Front Ranges, composed of parallel cuestas and hogback ridges, separated by roughly north-south structural depressions, or *valles*. About the latitude of Tucumán this kind of country comes to a southern ending: south of Tucumán the mountain landscape and the

landscape of the eastern piedmont are quite different from the landscapes farther north (Map 52).

The natural vegetation, also, is a southward continuation of the types already described in Bolivia (Maps 35 and 53). The high Puna is covered with a scanty growth of widely spaced xerophytic shrubs. On the east-facing edge of the Puna and on the tops of some of the more prominent Front Ranges there is a narrow belt of mountain forest—a *Ceja de Montaña*—composed of a dense growth of semideciduous broadleaf trees. A scrub forest covers the Chaco and invades the valles of the Front Range zone. All these types reach a southern ending at approximately the latitude of Tucumán.

The decreasing supply of moisture along the eastern piedmont is reflected not only in the increasingly xerophytic character of the natural vegetation, but also in the type of agriculture. South of Tucumán no crops can be raised along the piedmont without irrigation. From Tucumán northward irrigated and unirrigated crops are mixed: some of the sugar cane at Tucumán is unirrigated as are also some of the fields of maize in the valles around Salta and Jujuy. But in this zone there are also many irrigated spots, especially where the alluvial soils are very porous. Generally there is no permanent surface water in the valles, and irrigation is limited to the heads of the alluvial fans that emerge from the quebradas. Tucumán, however, is abundantly supplied with water from the several streams which descend from the Sierra de Aconquija, a commanding range more than seventeen thousand feet high, which here forms the eastern border of the mountain zone.

South of about latitude 27° S. the territory lying between Tucumán, Mendoza, and Córdoba is dry land, composed of elongated and roughly north-south ranges and broad depressions with salt flats or salt lakes along their bottoms (Map 52). This is a typical mountain-and-bolson landscape, similar to the Great Basin region of the United States—a region mostly without exterior drainage.

Colonial Settlement in the Northwest

Even before the arrival of the Spaniards the permanent settlements in this part of South America were made by people who came from the highlands. The Incas established a fortress in the vicinity of Tucumán, and maintained their control of the Indians inhabiting the valles of the Front-Range zone. The Incas, however, were unable to do more than hold in check the raids of the nomadic Indians of the plains. Proceeding along

NORTHWESTERN ARGENTINA
SURFACE CONFIGURATION
PLAINS
INTERMONT BASINS
HILLS AND LOW MOUNTAINS
ANDES
JUJUY
SALTA
PUNA DE ATACAMA
RIO SALI
TUCUMAN
RIO SALADO
RIO DULCE
SIERRA DE ACONQUIJA
CHILE
ARGENTINA
SANTIAGO DEL ESTERO
CATAMARCA
LA RIOJA
RIO SALADO
SIERRA DE CORDOBA
CORDOBA
SAN JUAN
MENDOZA
SAN LUIS
28°
32°
64°
68°
SCALE
0
100
MILES

MAP 52

NORTHWESTERN ARGENTINA
NATURAL VEGETATION
BARREN DESERT
PRAIRIE
MONTE
MOUNTAIN FOREST
TROPICAL SCRUB FOREST
PUNA
BARREN MOUNTAINS
MOUNTAIN BORDER
64°
28°
28°
32°
32°
64°
SCALE
0
100
MILES

MAP 53

the Inca road, the Spaniards, on the way to Chile, passed through what is now the Argentine Northwest. All the important towns, as we have said, were established between 1551 and the end of the sixteenth century (124).

During the whole colonial period these settlements were attached economically to the highlands and to the West Coast. The restriction of Spanish colonial trade to the Panamá route kept Buenos Aires in the category of a smuggling port; but the Argentine plains produced one item of such importance to the highland centers that the whole economic life of the region was oriented toward the Northwest. If there is any one creature to which credit should be given for the conquest of the South American continent it is the mule, for this animal alone made possible the transportation of goods over the rugged mountain trails at very high altitudes. And the Argentine plains became the chief source of this patient, sturdy, but sterile, offspring of a mare and a jackass. Because mares could not be kept at the high altitudes and on the scanty feed available in the mining regions of Peru and Bolivia, it was necessary to breed the mules elsewhere, and maintain a constant stream of re-enforcements on the way toward the highlands.

The mule trade developed distinct currents of movement and centers of commerce. The breeding went on mostly on the grassy plains between Córdoba, Rosario, and Santa Fé. In this district there were seminomadic herders of cattle and mules, who, like the Llaneros of Venezuela, established no permanently fixed settlements. These were the picturesque gauchos. The cattle were of value chiefly for their hides, but the demand for young mules was apparently unlimited. The young animals were first concentrated on irrigated pastures around Córdoba, Santiago del Estero, and Tucumán. Each year, in the latter part of April, herds of two-year-old mules were started northward, reaching Salta before the end of June. From June until February they were fed on irrigated pastures in the valles around Salta. In February and March an annual fair was held at which three-year-old mules were traded for silver from Peru and Bolivia, or expensive products imported through Lima and Panamá from Spain. By the end of March, when the summer rains had subsided enough to make the trails passable, the new owners started northward with their mules, and the plainsmen started on the return journey southward. During the colonial period Salta, through its annual fair, was the main commercial center of this whole region (119). There, during the latter part of the eighteenth century and the early part of the nineteenth, as many as 60,000 mules were traded annually.

Salta and Jujuy in the Modern Era

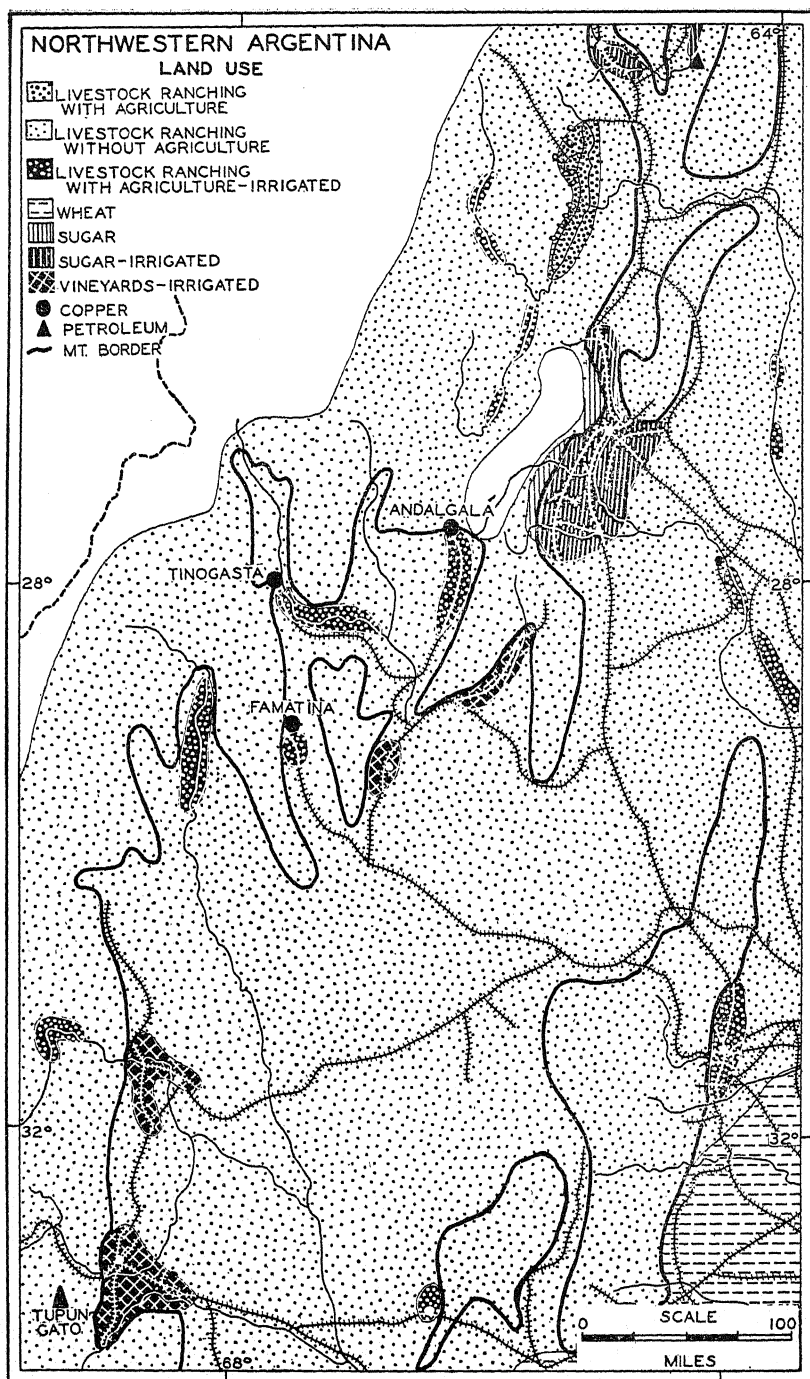
Salta today is a place of small importance. No longer the focus of the economic life of the chief area of settlement in Argentina, Salta is now a remote outpost, with only a vestige of its former commerce in livestock. During the height of the nitrate mining activity in the Atacama, herds of cattle, after being fattened on the pastures around Salta and Jujuy, were driven over the long, dry route westward across the Puna to the desert markets; but since the decline of mining activity this movement has dwindled to almost nothing. Minor commercial contacts are maintained between the communities of the valles, which produce wheat and maize, and the communities of the highlands, which produce wool and salt. The large estates of the valles, which include many square leagues of mountain pasture, are still used primarily for the production of low-grade beef animals. In the winter, when the lowlands are dry, the cattle are driven into the highlands; in the summer they return to the pastures lower down. The croplands of the lowlands, irrigated or unirrigated, are used mostly for the production of the food crop, maize, and the feed crop, alfalfa, on which the animals are fattened for local markets (Maps 52 and 54).

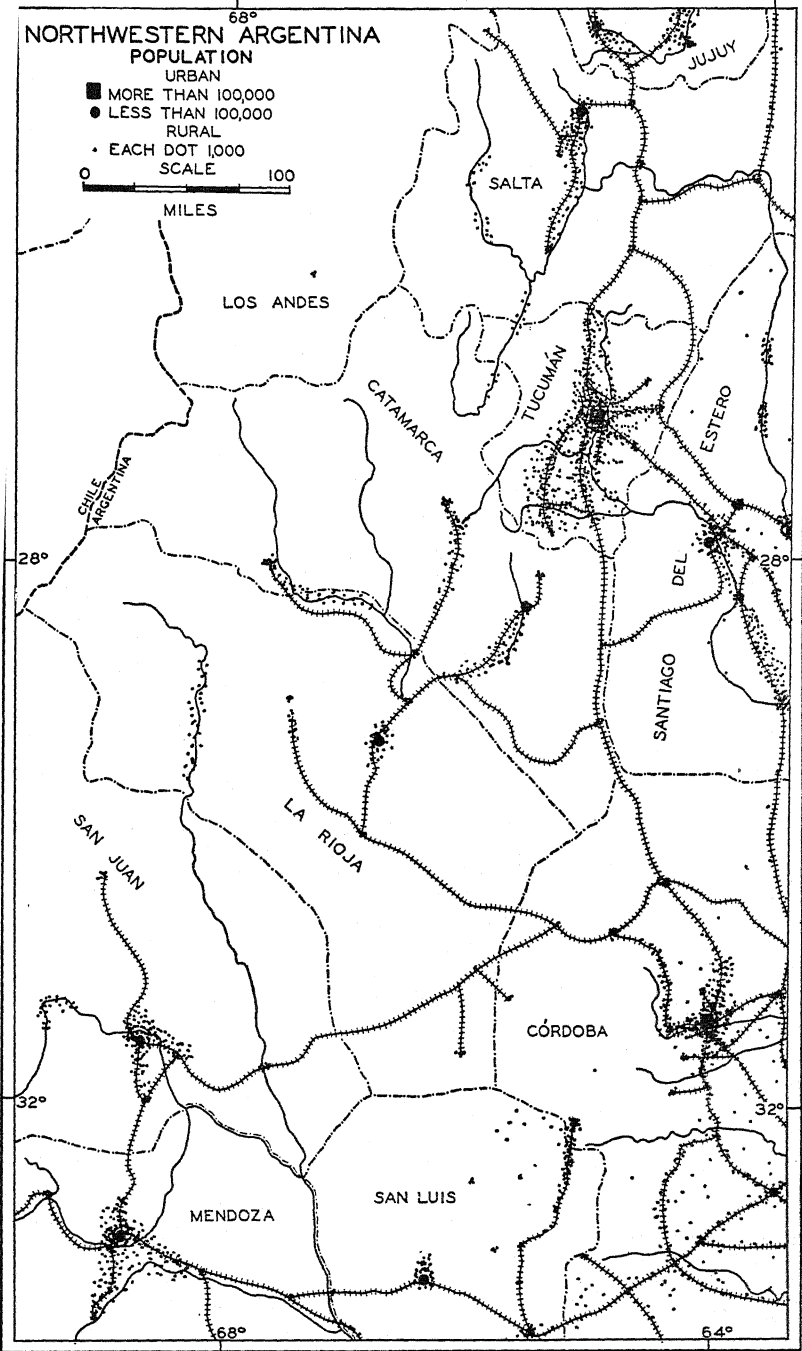
The problems of settlement in the modern era in the valles of Northwestern Argentina are similar to those previously described for Bolivia. The difficulty is primarily the result of remoteness and small area. From the point of view of climate and soil these districts could be made very productive; but each valle is too small to support a community large enough to pay the high costs of building roads to outside markets. Scattered, isolated communities of small size, like those of Highland Bolivia, are the result.

Tucumán

Tucumán, on the other hand, has been able to solve the problem of access to a market. The growth of this city to a population of nearly 150,000, and the concentration in the Tucumán district of more than three hundred people per square mile, is the result of an interesting combination of factors, among which the factor of location is of fundamental significance (Map 55).

During the colonial period Tucumán enjoyed a strategic position on the main route of travel between the Argentine plains and Salta. The roads from Rosario, Córdoba, and Santa Fé converged on Tucumán rather than on Salta because here the route across the dry belt was relatively easy. Two rivers, the Salado and the Dulce, provide an ample

NORTHWESTERN ARGENTINA
LAND USE
LIVESTOCK RANCHING WITH AGRICULTURE
LIVESTOCK RANCHING WITHOUT AGRICULTURE
LIVESTOCK RANCHING WITH AGRICULTURE-IRRIGATED
WHEAT
SUGAR
SUGAR-IRRIGATED
VINEYARDS-IRRIGATED
COPPER
PETROLEUM
MT. BORDER
64°
ANDALGALA
TINOGASTA
28°
28°
FAMATINA
32°
32°
TUPUNGATO
68°
0
SCALE
100
MILES

MAP 54

NORTHWESTERN ARGENTINA
POPULATION
URBAN
MORE THAN 100,000
LESS THAN 100,000
RURAL
EACH DOT 1,000
SCALE
0
100
MILES
68°
JUJUY
SALTA
LOS ANDES
CATAMARCA
TUCUMÁN
DEL ESTERO
SANTIAGO
DEL
CHILE
ARGENTINA
28°
28°
LA RIOJA
SAN JUAN
CÓRDOBA
32°
32°
MENDOZA
SAN LUIS
68°
64°

Map 55

supply of surface water along this route: north of the Salado no road crossed the Chaco from the Paraná to the Andean piedmont. Tucumán was the center through which almost all the colonial trade of Argentina passed. This town was an important outfitting point not only for people starting northward toward Salta, but also for those who wished to enter the grassy plains to the southeast. Wagon manufacturing and harness making were undertaken, and in the course of more than two centuries a considerable amount of wealth was accumulated by the people of this active community. When the colonial period came to an end, and Argentina reoriented its economic life, Tucumán remained a city of wealth and historic tradition.

The rise of modern Tucumán as a sugar-cane district came late in the nineteenth century. Physical and economic conditions were favorably combined at just this one spot for the successful planting of sugar cane for the supply of the Buenos Aires market: Tucumán was barely within range of the big metropolis, transportation costs until recently having been too high for the shipment of sugar from places farther north; and Tucumán also lies barely within the range of sugar cane, for the frosts are too severe for this crop farther south and east. In just this district, moreover, an alert and active people possessed the necessary capital, aided by some additional capital from British investors, to start the new plantations and set up the sugar mills. The rapid development of sugar-cane planting started during the last quarter of the nineteenth century and had reached full development by the beginning of the First World War.

The Tucumán district possesses several physical advantages for the cultivation of sugar cane which are not to be duplicated elsewhere in the northwest of Argentina. The zone of Front Ranges comes to an end just north of Tucumán, and the eastern border of the Puna is surmounted, just west of Tucumán, by the high Sierra de Aconquija. No obstruction stands between this range and the warm, moist winds from the east (Map 52). The result is a zone of abundant rainfall on the slopes of the Aconquija, supporting there, at intermediate altitudes, the southernmost end of the dense tropical semideciduous forest (Map 53). From this belt of abundant rain and from the snow fields higher up, several permanent streams descend to the piedmont, crossing the alluvial fans to join the Río Sali—the headwater of the Río Dulce, which flows by the site of Tucumán itself. As a matter of fact, the rainfall at Tucumán is about 37 inches a year, and between the Río Sali and the base of Aconquija there is not only an abundance of water in the streams, but also enough rainfall in the average year to render irrigation unnecessary (Map 10). The rainfall,

however, is subject to irregularities, and irrigation is actually practiced to guard against drought. On the eastern side of the Sali there are no tributary streams to provide water for irrigation, and the rainfall decreases rapidly as one proceeds away from the mountains.

This island of abundant rainfall produced by the slopes of the Sierra de Aconquija is also an island of relatively mild winter temperatures. The cloud banks have the effect of cutting down night radiation so that the minimum winter temperatures do not drop so low as they do under clear skies even somewhat farther north. Close to the base of the mountains the Tucumán area is frost-free, for this zone is given additional protection by the rapid air drainage near the tops of the alluvial fans. As one proceeds eastward the decrease of the fan slopes and of the protecting blanket of cloud results in an increase in the frequency of frosts. Near the mountain, frosts are limited to pockets where the cold air accumulates; but farther out, killing frosts nearly every winter make sugar production costly and speculative. Frost-free areas are found for about thirty-five miles east of the mountain front.

Sugar Plantations. All these facts, however, were not known to the first sugar planters of Tucumán. They have been discovered chiefly by the wasteful process of trial and error; and the wreckage is still visible of plantations developed too far to the east where frosts are too severe. Of much greater importance in determining the location of the first plantations were the roads and railroads. Sugar-cane growing started near the city of Tucumán, and one line of estates was extended southeastward along the east side of the Río Sali, where the land was easier to clear than it was nearer the mountains. In 1874 a railroad was built southward from Tucumán on the west side of the Río Sali to connect with Córdoba, and this became a second axis of new sugar-cane planting (Map 54); and between 1888 and 1890 a branch railroad was built in the form of a loop to open up the country closer to the mountain front. New plantations were set out at once along this line. Most of the plantations which have since filled in the space between these two railroads are supplied with systems of irrigation.

Meanwhile the sugar planters have actually invaded the mountain region, climbing the lower slopes of the Sierra de Aconquija. In this section irrigation is not practiced, for the abundant rainfall and the rich forest soil bring high cane yields. Although the sugar content of the cane on the mountain slopes is less because of the decreased amount of sunshine, up to a certain point this decrease is not serious. Through the whole area sugar cane occupies more than 60 per cent of the land

devoted to crops, and the sugar area is more than twice as great as that used for maize—which is a very different agricultural picture from that of Jujuy and Salta where maize occupies the larger acreage.

The sugar lands of the Tucumán District are owned and operated in a variety of ways. There are large estates on which the work is performed by hired laborers; there are estates worked by tenants who pay rent to the owners; and there are many independent growers working on their own small properties. The refineries, or *ingenios*, are not owned by the individual planters but by independent companies; the network of railroad lines necessary to bring the cane promptly to the mills at harvest time are also owned and operated by independent companies. The competition that develops each year among the mill owners for the purchase of cane from the planters has the effect of raising the price which the planters receive.

Sugar-cane planting is a form of agriculture which requires the services of a large number of people. As the new industry developed it was necessary to recruit gangs of laborers in neighboring communities, such as Santiago del Estero, Catamarca, and even Córdoba. As time went on, the population of the Tucumán area was increased by the arrival of many people from other parts of Northern Argentina who settled permanently on the sugar plantations or in the vicinity of the ingenios. Relatively few came directly from foreign countries, and for this reason Tucumán still retains a character distinct from that of the other big cities of Argentina. At present the Tucumán district has a population of more than 500,000 people, and a much higher rural density than that of any other part of Argentina. Nevertheless the labor demands of the harvest season are so great that during the period from June to October many additional workers come to the sugar district from small communities scattered throughout the North and Northwest.

The Decade from 1930 to 1940. Prosperity and optimism, based in part on increasing land values, came to the cane planters of Tucumán just as they came to other people of the Occidental world whose products were being absorbed in an expanding market. The Argentine government adopted the policy of protecting the domestic producers by imposing a high tariff. Yet from the start the planters were disturbed financially by the considerable fluctuations in yield from year to year. In 1926 the production greatly exceeded 400,000 tons, and the domestic market was flooded. The resulting decline in prices forced the limitation of cane planting—first by agreement among the planters, later by action of the federal government. Tucumán, before 1930, accounted for more than

Late in the nineteenth century Tucumán, in northwestern Argentina, became an important sugar-cane district. Today it supplies most of the sugar consumed in Buenos Aires. In the upper picture men are seen harvesting the cane. (Courtesy of the Ministerio de Relaciones Exteriores de la República Argentina.) The lower picture is of a vineyard at Mendoza. This photograph was taken in the spring before the leaves had appeared. The deep furrows, made by a tractor-drawn plow, serve to irrigate the vines during the hot summer months. Mendoza

80 per cent of the Argentine sugar production; but now its share is less than 70 per cent, owing to the increase of planting in Jujuy and in the forest clearings in the Chaco. In 1938 the total Argentine production was 464,000 tons, to be absorbed by a market which, it was then estimated, could take no more than 410,000 tons. Production so definitely exceeded the market capacity that the carry-over of unsold sugar became a serious menace to financial stability. Prosperity and optimism have been replaced by perplexity, as elsewhere in a world of narrowly partitioned trade areas. In Argentina as in the United States many writers have attempted to decide whether this condition represents "overproduction" or "underconsumption."

Mendoza and the Vineyard Oases

Agriculture changes notably south of Tucumán. North of that city maize and sugar cane in varying proportions are the chief crops. Although the rainy season both to the north and to the south of Tucumán is in summer, the annual rainfall diminishes so rapidly toward the south that no crops can be raised nor animals pastured without the aid of irrigation. South of Tucumán alfalfa rather than maize is the crop which covers the largest area, and vineyards assume first place in the commercial life. The so-called vineyard oases include three large ones: Mendoza in the middle, San Juan about one hundred miles to the north of Mendoza, and San Rafael about the same distance south of Mendoza (Map 52. San Rafael lies just south of the area shown on this map). In addition to the three large oases, there are the smaller irrigated areas of La Rioja and Catamarca, which lie between San Juan and Tucumán.

In this part of Argentina the great dry belt of South America spreads its full width across the plains to the east of the Andes. Between Córdoba and Mendoza the rainfall is very slight. At Mendoza itself the average is only 7.6 inches, and at San Juan, 3.5 in. This is also the zone of transition between the hot deserts of the north and the cool deserts of Patagonia (Map 10).

Water for irrigation is essential for permanent settlement in this desert land. Wherever streams which tap the snow fields of the high Andes emerge from the mountains onto the eastern piedmont, oases are established. The oasis of San Juan is supported by the Río San Juan. For many miles south of San Juan no permanent streams break through the eastern rampart of the Andes; then two important rivers, the Río Mendoza and the Río Tunuyán, emerge within a short distance of each other.

The water of these two streams is used to form the large irrigated tract around Mendoza. Still farther south two other rivers, the Diamante and the Atuel, support the oasis of San Rafael.

The region as a whole is one of interior drainage. The streams descend from the mountains over broad alluvial fans which stretch out eastward with gradually decreasing slopes. Only the larger streams persist in their flow across these fans. All unite their waters in a zone of sloughs or playas, which, on some maps, are indicated with a river symbol, although a current of surface water is in reality only developed in time of flood. Occasionally water makes its way through these sloughs to the Río Colorado (Map 56), but most of the time water escapes only by evaporation.

The rural landscape of the vineyard oases is distinctive. Always in the background are the naked, rocky slopes of the easternmost ranges which shut out the view of the higher peaks, such as Aconcagua. In the foreground on irrigated land are straight rows of vines, some festooned on trellises, some pruned low on wires, but all threaded with the little irrigation ditches. Actually a larger area is devoted to fields of rich green alfalfa, which is used for the fattening of range cattle—the traditional activity of the whole Northwest piedmont. Between the fields, and along the sides of the dusty roads there are long rows of tall, slender poplars; and here and there groups of houses are to be seen, low, one-story structures with whitewashed adobe walls and red-tiled roofs.

Mendoza preserves much less of the atmosphere and tradition of colonial Argentina than does Tucumán. A disastrous earthquake in 1861 destroyed the colonial city, and modern Mendoza dates from that catastrophe. Furthermore, when the population of the Mendoza oasis made a very rapid growth during the early years of the present century, much of the increase was the result of the arrival of immigrants directly from Italy. In 1914 the population of Mendoza included 31 per cent who were foreign born. Today, with a population of more than 82,000, Mendoza has a much larger proportion of people of Italian descent than is the case in Tucumán.

Crops and Products of the Vineyard Oases. Vineyards and alfalfa, as we have said, are of predominant importance in the oases south of Tucumán. Of the 840,000 acres of irrigated land in the whole group in 1936–37, about 40 per cent was devoted to alfalfa and about 30 per cent to wine grapes. The chief concentration of wine grapes and of wine manufacture was in the Mendoza oasis.

Two different groups of people carry on the two processes of growing

the grapes and making the wines. The French geographer, Pierre Denis, was quick to notice the contrast with his own country, where each estate produces a distinctive wine from its own grapes (1). But in Mendoza the making of wine is an expensive process which, because of the high temperatures which prevail at the harvest time, requires a considerable capital investment in special equipment. Big wineries, or *bodegas*, purchase the grapes from the owners of the vineyards and manufacture the wine in large quantities. Most of the product is sold in the domestic market, which is protected by a tariff.

The growers of grapes, like the planters of sugar cane, have suffered losses during the era of declining prices, and in some instances have turned to other forms of agriculture. In 1934 the Argentine government purchased 350,000 tons of grapes in order to relieve the effects of overproduction. In the years just before the beginning of the Second World War, many vineyards were destroyed and the land was used for the planting of other kinds of fruit. The proportion of the area devoted to wine grapes has probably decreased since 1936–37, in favor of orchards of pears, peaches, apples, plums, cherries, and apricots. The oasis of San Rafael has become one of the new centers of pear production. Argentine pears had just become established on the British market when the Second World War started.

Mendoza as a Pass City. In addition to its functions as the commercial and manufacturing center of an oasis community and as the political center of a state, Mendoza also plays the role of a pass city. Its importance as a pass city dates back to the first century of Spanish settlement. At that time the most important colony on the Argentine piedmont of the Andes was Tucumán, and the most important colonies on the Chilean side were in the Vale of Chile, inland from Valparaiso, and in the Central Valley around Santiago. Passes over the Andes near Tucumán are very high and require a long difficult journey across desert country. But the most direct route to the Vale of Chile is the route over the Uspallata Pass, just west of Mendoza. To be sure this pass requires a climb of 12,602 feet above sea level, but the approaches on both sides are direct. South of Uspallata there are passes which are much lower: the route from the head of the valley of the Bío-Bío to Neuquén on the Argentine side requires a climb of only 4,518 feet, and still farther south there are passes below 1,000 feet. But these lower passes south of Uspallata were not used during the colonial period because, first, they were far off the direct line between Tucumán and Santiago, and secondly, travelers south of Mendoza or south of the Bío-Bío were constantly exposed to

Indian attacks. Consequently the Uspallata Pass became the chief line of travel between the Argentine piedmont and Middle Chile, and Mendoza was the point of departure on the eastern side.

The volume of travel over the Uspallata was never so great as that which flowed from the Argentine plains through Tucumán and Salta northward into the highlands. Because of the similarity of the products of Middle Chile and of the Argentine piedmont oases there was no pressing demand for exchange between the two regions. Since independence, the economic interests of Argentina and Chile have developed along very different lines, and lines which are not at all complementary to each other. When the construction of a railroad was undertaken in 1889, this traditional route was followed because it was still the most direct one between Buenos Aires and Santiago. The railroad was not completed until 1910, when a long tunnel was opened through the main cordillera. But operation of the line proved difficult and the revenue small. The grades were steep, requiring the use of many miles of rack and cog; almost every winter heavy snows blocked the line in spite of the construction of snowsheds. Finally a heavy flood on January 11, 1934, washed out a long section of the track, and the line has never been rebuilt.

Passenger and mail service between Chile and Argentina still demands some trans-Andean transportation, and the air service across the mountains has proved very useful. In 1940, an automobile highway was built as a substitute for the washed-out section of the railroad; it passes through the old railroad tunnel. During the summer months many travelers prefer the roundabout but very beautiful route through the Chilean and Argentine lake districts, farther south, crossing from Valdivia to Neuquén (Map 56). But the almost complete economic orientation of modern Mendoza and its neighboring oases toward Buenos Aires results in very little need for bulky transport service with Chile. Like the other communities of the Northwest piedmont, the economic orientation is now toward the east, and the Andes have become even more of a barrier than they were during the first part of the period of Spanish settlement.

Mining Communities of the Northwest

In addition to the agricultural communities of the Northwest there are a few tiny clusters of people engaged in the exploitation of minerals. Mining activities are not of great significance in Argentina; yet the relatively small mineral production includes a variety of materials. Copper

ores have been found at many places, notably at Famatina and Tinogasta, (Map 54) northwest of Catamarca. North of Jujuy there are lead mines in operation. Small communities near San Juan and Mendoza are engaged in mining low-grade deposits of lignite. Great hopes are expressed for the oil fields of the Northwest piedmont, which represent a southward continuation of the Bolivian fields. Some wells are already in operation east of Salta, and near Mendoza. The latter field is thought to have the largest possibility of development, although none of them is likely to be of major importance. In addition, minor deposits of silver, tin, manganese, tungsten, and iron are known.

MESOPOTAMIA

The Northwest is a land of mountains and piedmont oases, a land which was settled from Lima and for centuries was intimately linked with Chile and Peru. The northeastern part of Argentina, the region we shall call Mesopotamia, is, on the other hand, a land of abundant rains, of forests and rolling grassy plains, a land which has its closest foreign connections with Paraguay and Uruguay. Not only does it differ physically from the Northwest, but it also differs greatly in the traditions and viewpoints of its inhabitants.

Mesopotamia, or the country between the Paraná and Uruguay rivers, is composed of gently rounded, grass-covered interfluves, or *cuchillas*, and swampy, forest-filled valleys (Maps 48 and 49). It is a region of hot, rainy summers and mild winters, not unlike the wetter portions of Oklahoma and Texas. The arm of Argentina that is bent around the southern and eastern part of Paraguay, known as the Territory of Misiones, includes a portion of the Paraná Plateau, a region of abundant rains and dense mixed forests of pine (*Araucaria*) and broadleaf species. Here the Paraná and its tributaries have cut deep canyons in the flat-topped plateau; and where these rivers drop over the edges of the lava formations there are spectacular falls—the Guayra Falls of the Paraná and the Iguazú Falls on the Río Iguazú.

Settlement of Lowland Mesopotamia

The first settlements in Mesopotamia were made along the Río Paraná by people returning southward from Asunción. Corrientes was founded in 1588, and Paraná (opposite Santa Fé) at about the same time. Both these places were located where high ground not subject to inundation stands close to the main channel of the river.

The Río Paraná, however, has played the part of a barrier, isolating the people on either side, rather than the part of a great artery of travel, on which the interests of the people on either side are focused. The course of settlement differs notably on the two sides—even the natural vegetation differs along this river boundary (Map 7). The Paraguay-Paraná-Plata was well described by Barclay as the fairest seeming, yet actually most disappointing, of inland waterways.[1] With its winding and shifting course, its annual floods that cover a very wide area, its shallow channel frequently clogged with sand bars, this great river offers a very poor route of travel. We have already discussed the difficulties which the Paraguayans have had to face in establishing their connections with Buenos Aires.

The little town of Corrientes offers an interesting illustration of the small importance of the river as a line of travel. At first glance Corrientes would seem to occupy a position of extraordinary strategic importance, for just upstream the two great branches, the Alto Paraná and the Paraguay, join. The fact is, however, that Corrientes, far from being a focus point of the routes of travel, occupies only a remote and isolated corner of Mesopotamia. It is reached by road and railroad from the main line of transportation to Posadas. The district around Corrientes has remained chiefly pastoral in its economic activities, although tobacco from this area was of some importance in the colonial period. The town and the district it serves have suffered for their dependence on the river.

The settlement of the interior of Mesopotamia has never been pushed with so much vigor as the settlement of the Pampa shore, south of Santa Fé. The pastures of Mesopotamia might have been just as good for the raising of mules as those of the Rosario-Santa Fé district, but the mules on the north and east side of the wide belt of floodplain could have been brought to the western side only with very great difficulty. Mesopotamia is still used primarily for the grazing of cattle on large estates. The southeastern part of Mesopotamia has become one of Argentina's leading sheep districts, and one of the major sources of the wool which enters into Argentine exports. In the last decade, maize and flax have crossed the Paraná and invaded the southern part of Mesopotamia, which is now the leading flax-producing area of Argentina. The northern part of the region, however, remains purely pastoral.

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[1] W. S. Barclay, "The River Paraná: An Economic Survey," *Geogr. Journ.*, Vol. 33, 1909: 1–40.

Settlement of the Territory of Misiones

The settlement of the Territory of Misiones has been supported since colonial times chiefly from the production of yerba maté. The first European settlements in this part of the Paraná Plateau were established by the Jesuit Fathers who built missions and brought the native Indian inhabitants together in fixed agricultural communities; the planting of yerba maté was first attempted around these missions. When the Jesuits were expelled (from Brazil in 1759, and from the Spanish colonies in 1767), the plantations were abandoned, and the maté production was derived wholly from the collection of leaves from trees growing wild in the forests.

During the last three decades the plantation system has again been introduced, this time concentrated in the area just east of Posadas (Map 50). Small clusters of people are grouped permanently on these plantations, but since the labor requirements are heavy only at the harvest time, the groups of permanent workers are small. Maté pickers are in such great demand at harvest time that they must be recruited from a wide area, some of them coming even from Paraguay and Brazil.

The extension of the Argentine settlements northward to Posadas, and more recently into Misiones, has led Brazil to attempt a similar expansion of pioneer colonists on the other side of the Río Uruguay, in the western part of the Brazilian state of Rio Grande do Sul. The Brazilian settlers are maize and hog farmers, however, rather than maté cultivators. This may lead eventually to the creation of another international boundary passing through an area of concentrated settlement—but in this case the settlement will have taken place long after the boundary itself was established.

Yerba maté is little used outside of Argentina, Paraguay, Uruguay, and Southern Brazil. The Argentine planters sell most of their product in the domestic market, although some attempt is now being made to develop a market for it in Europe and North America. Like the sugarcane planters and the vineyard owners, the maté growers have produced in excess of the capacity of the domestic market. In the last decade the expansion of the plantations has been strictly limited.

THE CHACO

Between the Río Paraguay-Paraná and the piedmont settlements of the Northwest lies another of the larger divisions of the Argentine North. This is the Gran Chaco, the Argentine part of the great lowland region

which extends northward from about latitude 30° S. into Paraguay, eastern Bolivia, and western Brazil. The Argentine Chaco, like the country farther to the north, is a region of scrub forest interspersed with patches of grassy savanna (Maps 48 and 49. Owing to the lack of precise maps, the actual pattern of forest and savanna could not be shown). There are places where the thorny, deciduous trees grow close together in veritable thickets, difficult to penetrate. There are places, especially near the rivers, where the taller trees form bands of dense semideciduous forest. There are places where the scrub trees are widely spaced, like apple trees in an old orchard, and where the forest floor itself is grass-covered. And there are also places where the forest is interrupted by extensive savannas—perhaps the result of repeated burnings, perhaps the result of conditions of the soil or ground water.

Some of the highest temperatures recorded in any part of South America occur in the Chaco (Map 8). This region is located on the margins of the tropics—in the lower middle latitudes—in a climatic position more or less similar to that of the Ganges Plain of India and of the Gulf Coast of Texas and Louisiana. The summers in these latitudes are very hot: although none of the Chaco stations record temperatures so high as those of northern India, they are similar to those of the Gulf Region of North America; month by month the temperatures of Santiago del Estero are within a few degrees of the temperatures of New Orleans. Occasionally, even in summer, and frequently in winter, there are cool spells, introduced by thundershowers, as cold air masses of polar origin push northward through this lowland against the stream of hot and humid equatorial air from the north. The winters are mild and relatively dry, with occasional frosts in the southern part of the region.

The rainfall is heaviest in the east and decreases toward the west (Map 9). Corrientes receives an average of 48.5 inches a year, but Santiago del Estero, about 75 miles east of Tucumán, receives an average of only 20.4 inches. With the high rate of evaporation which exists in a region of such high temperatures, twenty inches is not sufficient to permit agriculture without irrigation. The boundary between sufficient moisture and deficient moisture runs north and south through the Chaco about midway between the Paraná and the piedmont of the Andes (the line between BSh and Cwa on Map 10).

The whole Chaco is a great lowland plain, interrupted in few places by prominent surface features. It is composed mostly of the alluvium brought by the rivers from the erosion of the Andes. During the summer rainy season vast areas near the streams are inundated. Along the

eastern side of the Chaco, near the Paraná, the summer floods are sometimes not more than a foot or so in depth, leaving the railroad embankments and the permanent settlements standing above the sheet of water like islands and peninsulas. The drier western side of the Chaco is flooded only along the courses of the few streams—the Pilcomayo, the Bermejo, the Salado, and the Dulce. These rivers follow braided and shifting courses, changing position each year during the period of high water, in some years changing the pattern of their channels radically. As a political boundary, therefore, the Pilcomayo is anything but satisfactory, and may become a source of trouble as the region is developed.

Settlement of the Chaco—the Southern Border

Most of the Chaco region remains scantily inhabited (Map 51). The chief areas of permanent settlement are to be found along its southern and eastern margins, focusing on Santiago del Estero, Santa Fé, and Resistencia (Map 48).

The oldest of the settlements on the margins of the Chaco is the string of agricultural communities along the courses of the Río Salado and the Río Dulce. Long before the arrival of the Spaniards, the Indians had made sporadic use of the floodplains of these rivers, for after the annual floods there was enough moisture to support good crops of maize. From Tucumán to Santiago del Estero, the Dulce is closely confined between high banks. At Santiago, however, the floodplain widens, and the river channel is split into numerous distributaries in a typical braided pattern. In the shallow depressions of the floodplain, after the floods recede, good yields can be had from the planting of maize, wheat, flax, and cotton. Croplands, irrigated in this manner by the annual floods, are known in Argentina as *bañados*.

The pattern of these bañados along the courses of the Salado and the Dulce is neither continuous nor permanent. Not all of the floodplains can be utilized in this way, for where coarse gravel has been deposited, or where the surface is so low that it remains covered with stagnant water after the flood season is over, bañados cannot be developed. Moreover, the distribution of these arable spots along the rivers is not fixed; not only does the channel shift from year to year, but also each flood changes the pattern of fine and coarse alluvium, and of low places which do not dry out sufficiently. As a result this district has witnessed notable changes in the areas devoted to crops, and some of the early communities have been entirely abandoned and new ones have sprung up. Santiago

del Estero, located at the lower end of the narrow channel on the Dulce, enjoys greater stability than the other towns of this district.

The agricultural population of the Santiago area is not closely attached to the land. The private estates, into which the whole area is divided, include not only stretches of floodplain along the rivers, but also large areas of grazing land in the scrub forest to the north. When some of the land on an estate is found to possess the necessary qualities for the development of a bañado, tenant farmers are introduced and crops are planted. When the conditions change and crops can no longer be raised, the tenants depart. In the meantime the pastoral activities of the estate go on without interruption. During the period of rapid growth in the sugar district around Tucumán, the population of the Santiago district declined rapidly; at present there is a movement back from Tucumán toward the cotton fields of Santiago del Estero.

The Quebracho Forests

The penetration of the Chaco forest has taken place both northward from Santiago del Estero, and westward from a number of places along the Río Paraguay-Paraná. The first groups to enter were interested primarily in exploiting the forest itself, not in the development of agriculture. Among the scrub trees of the Chaco there is the species known as quebracho (literally "break-ax," because of its very hard wood)—a tree which contains a high percentage of tannin, used in the tanning of leather. In no other part of the world is there a similar forest from which this valuable substance can so easily be extracted.

The true quebracho, known botanically as *Quebrachia lorentzii*, grows under very peculiar conditions. It is found chiefly in the eastern part of the Chaco on the west side of the Paraguay-Paraná, and apparently occurs in dense growth only in those places where the ground water is strongly impregnated with salt. The presence of salty streaks in the ground water of the Chaco is a phenomenon which has never been adequately explained, but one which seems to be responsible for the presence of this valuable source of tannin.

In the western part of the Chaco there is another species of quebracho which has a dark red wood, and which contains much less tannin. The *Quebracho Santiagueño* or *colorado*—the red quebracho—contains only about 10 per cent of this substance but the true quebracho, known in Argentina as the *Quebracho Chaqueño*, contains as much as 30 per cent. The red quebracho, which is the chief type exploited along the railroad

running northward a little east of Santiago del Estero (Map 50), is used mainly for its wood for telephone poles, fence posts, sleepers, firewood, and for the manufacture of charcoal. In the treeless plains of Argentina the red quebracho has a wide variety of uses.

The exploitation of quebracho for tannin led to the first movement of settlers into the eastern Chaco. In 1850, woodcutters from Corrientes crossed the river to Resistencia and from there began the exploitation of an area especially rich in this forest resource. It is estimated that an average of something like 500,000 acres are cut over every year, and that at the present rates of cutting there will be enough trees to last for about 150 years.

One of the major problems of the quebracho industry is the shipment of the logs to the mills where the wood is processed for the extraction of tannin. Because this process requires a large amount of water, the mills must all be located near the Paraná itself, or in a zone some thirty to sixty miles wide in which there are tributaries to the Paraná. Inland from this zone of tributaries only the four large rivers previously mentioned cross the Chaco, and only in their floodplains can surface water be found with any certainty. The railroads which have been built northward from Santa Fé, with numerous branches extending westward into the forest, are used to ship the logs to the mills. Oxen drag the logs to the railroads, and forest cutting is restricted to a zone less than ten miles wide on either side of the tracks. Beyond this zone of cutting, the Chaco remains a wilderness.

Agricultural Settlement in the Eastern Chaco

The people who cut and haul the quebracho or work in the mills are not the ones who have settled on the land as farmers. Until recently, most of those who did attempt permanent settlement were cattle ranchers, who grazed their animals on the grassy savannas, and who sold a small but steady supply for meat to the forest workers.

The big agricultural development in the eastern Chaco, however, came during the 1930's, and was associated with the rapid increase of cotton production in Argentina. There are two chief axes of pioneer settlement. One is along the railroad which runs northwestward from Resistencia, and the other is along another railroad running in a similar direction inland from Formosa (Maps 48 and 50). Cotton can be grown without irrigation as far west as the 32-inch rainfall line—which is about 160 miles west of the Paraguay-Paraná. Resistencia is the chief nucleus

of this new zone of pioneer settlement, which has now extended northwestward about as far as climatic conditions are satisfactory for cotton without irrigation.

The location of these zones of specialized cotton production in the northern part of the Chaco rather than in the south, near Santa Fé, is the result of the distribution of private properties. Wherever the quebracho cutters left clearings in the Chaco forest, the land is available for agricultural or pastoral use, but in the southern part of the region the land is already divided into large private estates, used chiefly for the grazing of beef cattle. Only in the north are there large tracts of public domain—one of the few areas left in Argentina where the public domain is physically suitable for agricultural settlement.

Even in this new zone of pioneer settlement there is a lack of really close attachment to the land. Most of the colonists came without capital and settled as squatters on government land, not even arranging for preliminary titles. In 1937, something like 70 per cent of the farmers still had no titles to the land they cultivated, and were paying no rent and no taxes.

The majority of the colonists are people of European origin who have come from the Humid Pampa. Many nationalities are represented: Czechs, Spaniards, Russians, Yugoslavs, Bulgarians, and Austrians. Italians, who are very numerous in the central part of Argentina, are almost entirely absent from this frontier. On units of land ranging from sixty to two hundred and fifty acres the colonists have cleared the forest, where it was not already cleared, and, without previous experience, have undertaken the planting, cultivating and harvesting of cotton.

The stability of these settlements remains uncertain. Some of the successful pioneers have become wealthy, but others have been able to accumulate no earnings. In spite of the unsatisfactory conditions of ownership the government has treated the districts as permanent settlements and has gone to unusual lengths in the establishment of schools and other public services. Nevertheless, the homes are mostly temporary structures of mud plastered on a framework of poles, for no one wishes to build more permanently until title to the land is secured. The colonists who came to the northern Chaco were mostly pushed out from the Humid Pampa by economic conditions which were for the moment unsatisfactory. The Pampa is not so densely populated that any regular movement of new pioneers out from it can be expected. Because of the program of cotton restriction in the United States and the possibility of barter arrangements with Germany, a temporary situation was created

which seemed to offer large rewards for cotton-growing in Argentina, especially for farmers who could make use of public land free from rent or taxes. Whether this district could withstand a return to free competition without government aid, or whether it should be considered only a temporary development doomed to decline when prosperity returns to the central part of the country, remains to be seen.

PATAGONIA

The hot, humid forests of northern Argentina present a most complete contrast to the cool, dry, wind-swept plateaus of the south. South of the Río Colorado lies that part of Argentina which is given the general regional name, Patagonia. In this vast area which makes up more than 25 per cent of the national territory there is to be found scarcely 1 per cent of the Argentine people. Over most of the area the population density is less than one per square mile.

Patagonia is a land of strong individuality. The roar of the wind seldom ceases, and in the winter men and beasts seek the shelter of canyons and cliffs. It is not a steady, strong breeze like the trade winds of the low latitudes, but a boisterous stormy wind that carries rolls of cloud with it and that frequently changes its direction as different air masses sweep by. The haze of dust makes objects in the typical Patagonian landscape indistinct even at short distances. And in the west are some of the world's most spectacular mountains, carved by glaciers, and even now mantled in certain parts with glacial ice which is the nearest approach to an inland icecap that is to be found outside of the Polar Regions. Along the piedmont of the Andes there is a succession of marginal lakes, their upper ends deep in the mountain canyons where the water laps against the ice cliffs of the descending glaciers. The lower ends of these lakes are held in by knobby moraines, dumped by the formerly more extensive ice tongues of the glacial period. Here the green lake waters, churned into whitecaps by the violent winds, dash noisily on shingle beaches.

The Climate

In spite of its relatively high latitude, Patagonia is not a land of extreme temperatures. Most of this part of South America lies between 38° and 55° of south latitude—latitudes which are the equivalent of the territory in North America between Chesapeake Bay and Labrador. But

very low winter temperatures, like very high summer temperatures, are the result not only of latitude but also of protection from the moderating influence of the open oceans. The range of temperature, in general, increases with increasing latitude and distance from the sea: the world's greatest ranges between summer and winter are found in the higher middle latitudes of northern Siberia. But in South America the tapering of the land toward the south means that increasing latitude brings decreasing distance from the sea. The greatest ranges of temperature, therefore, in the whole of South America are found in the territory between Córdoba, Santiago del Estero, and Mendoza. Farther south the ranges decrease. The result in Tierra del Fuego is a marine type of polar climate (E on Map 10) in which the warmest month averages a little below 50°, but the coldest month averages above 32°.

As one proceeds southward, the last of the hot summers is to be found in the valleys of the Río Colorado and the Río Negro. At Choele-Choel, on the Río Negro (Map 56), the average of January is 75.4°. At Colonia Sarmiento, however, the warmest month averages 64.6°; and at Santa Cruz the average is only 58.6°.

No part of Argentine Patagonia receives much rainfall except the mountainous country along the western border (Map 9). Furthermore, a great contrast exists between the summer maximum of rainfall at Mendoza, and the winter maximum from Neuquén southward. In Patagonia, as far south as the Strait of Magellan the moisture is brought chiefly by the winter storms. The total amount of precipitation is very small: only 5.3 inches at Santa Cruz, and 4.9 inches at Colonia Sarmiento. A deficiency of moisture persists along the east coast from near the mouth of the Río Negro to a short distance north of the Strait of Magellan (Map 10). Most of the eastern piedmont of the Andes, also, is subhumid, with short steppe grasses forming a continuous sod cover only in a narrow zone along the mountain front (Map 57). In a few places, however, where valleys cross the cordillera and permit the penetration of the moisture-laden winds from the Pacific all the way to the eastern piedmont, there are little islands on the Argentine side where the rainfall is heavy enough to support a forest.

The desert of Patagonia is the only example in the world of an arid east coast in latitudes poleward of 40°. This aridity is only partly due to the rain barrier of the Andes. As cold air masses cross the southern part of the continent, cyclonic whirls precede the cold fronts as in the Northern Hemisphere, but with a clockwise, instead of a counterclockwise, rotation. This brings air onshore from the Atlantic. Moisture would be

precipitated by these cyclonic storms if the air from the east had not crossed a wide zone of cold water—the Falkland Island Current, which bathes eastern South America as far north as the southeastern edge of the Humid Pampa. This cold water is fully as important as the Andes in accounting for the aridity of Patagonia. Heavy sea fogs, like the garúas of Peru, are common, especially in the far south.

Surface Features and Water Supply

Landing on the desert coast of Patagonia is not easy. Cliffs at the water's edge mark the beginning of the plateaus (Map 56). In the southern part of the country there are a few embayments of the river mouths, such as those on which Santa Cruz and Puerto Gallegos are situated; but even here the landing of boats is made difficult by the very great tidal range. The water rushes in and out of the Río Santa Cruz, for instance, with a range in the spring tide of as much as forty-eight feet. Only at Punta Arenas on the Strait, and at Puerto Madryn, on a deep gulf north of Rawson, do boats tie up at docks.

Back of the coast the main part of the Patagonian Highland is made up of two surface elements. There are vast areas of level-topped plateaus, rising like a series of gigantic steps toward the west, where the highest tablelands are well over five thousand feet above sea level. These great plateaus are formed of horizontal strata, some of sedimentary origin, some composed of flows of dark-colored lava. The second surface element stands above the plateaus—areas of hilly land, composed of resistant crystalline rocks.

A number of deep canyons cross the Patagonian plateaus from west to east. Most of them contain no surface water at any time of the year, but a few carry some water all of the time, and a few have surface water intermittently. Along the canyon bottoms, even those which are permanently dry, common wells sunk in the gravel fill can tap a good supply of ground water. These canyons, with their water supply and with their cliffed sides, shelter most of the ranches of the country and offer the only safe routes of travel across the desert.

Outside of the canyons, the plateaus offer little to support settlement. In the higher crystalline hills or the higher plateaus the winter precipitation not infrequently comes in the form of snow, which, melting slowly, supports a fairly good growth of short grass, suitable in the spring for the grazing of sheep. During the summer, the plateaus are too dry even for sheep.

SOUTHERN SOUTH AMERICA
TALCAHUANO
CONCEPCIÓN
LEBÚ
LOS ANGELES
TEMUCO
NEUQUÉN
RIO COLORADO
RIO NEUQUÉN
RIO LIMAY
RIO NEGRO
CHOELE-CHOEL
VALDIVIA
OCEAN
SAN ANTONIO
VIEDMA
LAKE NAHUEL HUAPI
LAKE LLANQUIHUE
PUERTO MONTT
ANCUD
CASTRO
CHILOE I.
RIO CHUBUT
PUERTO MADRYN
TRELEW
RAWSON
PACIFIC
PUERTO AYSEN
COLONIA SARMIENTO
COMODORO RIVADAVIA
OCEAN
LAKE BUENOS AIRES
PEN. DE TAITAO
PUERTO DESEADO
LAKE VIEDMA
SANTA CRUZ
RIO SANTA CRUZ
LAKE ARGENTINO
ATLANTIC
SURFACE CONFIGURATION
PLAINS AND LOWLANDS
PATAGONIAN PLATEAU
CRYSTALLINE HILLY LAND
COASTAL RANGE
ANDES
PERMANENT ICE
GALLEGOS
ARGENTINA
CHILE
STRAIT OF MAGELLAN
PUNTA ARENAS
TIERRA DEL FUEGO
BRECKNOCK PENINSULA
USHUAIA
ISLA DE LOS ESTADOS
CAPE HORN
0 SCALE 200
MILES
40°
44°
48°
52°
56°
74°
70°
66°
62°

MAP 56

SOUTHERN SOUTH AMERICA
PACIFIC
OCEAN
ATLANTIC
OCEAN
ARGENTINA
CHILE
NATURAL VEGETATION
MEDITERRANEAN SCRUB FOREST
DECIDUOUS BEECH FOREST
SOUTHERN CHILE EVERGREEN RAIN FOREST
PRAIRIE GRASSLAND
MONTE
STEPPE
MONTE-SHORT GRASS TRANSITION
PATAGONIAN SHRUB
PERMANENT ICE
UNDIFFERENTIATED MOUNTAIN VEGETATION
0 SCALE 200
MILES
74°
70°
66°
62°
40°
44°
48°
52°
56°

Map 57

Plateaus and crystalline hills come abruptly to an end where the Andean structures begin. In many places the westernmost of the plateaus stand with cliffed sides facing toward the Andes, but separated from the steep mountain slopes by a narrow belt of lowland. This lowland forms a discontinuous series of basins between one and two thousand feet above sea level, which, taken together, can be called the *Pre-Andean Depression*. On the bottom of the Depression are the markings of glacial moraines and the beds of the formerly more extensive glacial lakes. From Punta Arenas on the Strait of Magellan, the Depression offers a continuous passage northward as far as Lake Argentino, the southernmost of the marginal lakes. North of this the Depression is interrupted at intervals by spurs of the Andes. The northernmost basin which forms a part of the Pre-Andean Depression lies north of Lake Nahuel Huapí.

The physiographic history of the Southern Andes is a remarkably interesting one, and one of considerable human importance. Even before the glacial period the rivers on the western side of the mountains had cut headward across the cordillera until they had shifted the continental divide all the way to the western rim of the plateaus. The Pre-Andean Depression was mostly drained to the Pacific by rivers which plunged westward through narrow canyons. The ice of the glacial period invaded these canyons and gouged them out into broad U-shaped troughs with hanging tributary valleys, characteristic of country sculptured by mountain glaciers. During the ice age, the glaciers not only invaded the Pre-Andean Depression, but, south of latitude 49° S., crossed the entire width of Patagonia and reached to the Atlantic. During the late stages of the last glacial period, however, while the ice still blocked the valleys across the Andes, the marginal lakes on the eastern piedmont were ponded and forced to drain eastward. As the ice continued to melt away and the mountain canyons were again opened, the lakes returned once more to the Pacific drainage. Today the cover of ice in the mountains remains only between latitudes 46° S. and 51° S., with a break at latitude 48° S. All the lakes except Viedma and Argentino now drain westward; these two still find an outlet across the desert plateaus through the Río Santa Cruz (Map 56).

The relation between the drainage divides and the crest of the Cordillera gave rise to what might have become a serious boundary dispute between Chile and Argentina. The Chileans claimed the drainage divide as the boundary while the Argentines claimed the crestline of the mountains—a conflict made possible by the vague wording of the boundary

description in the Treaty of 1881. Instead of settling the dispute by battle the two countries requested Great Britain to make an award. After a map of the country had been drawn, and the distribution of people had been studied, an award was made which granted to Argentina much of the lake country in the north, but gave Chile a wide stretch of the country east of the mountains in the south—even a small section of east coast along the Strait of Magellan.[2]

European Colonization in Patagonia

European colonization in Patagonia is a recent development. Before the nineteenth century the only settlement along the east coast was at Carmen de Patagones (on the Río Negro opposite the town of Viedma). Since this district was a source of salt, which was shipped by boat to Buenos Aires, Carmen de Patagones enjoyed a certain degree of permanence. The rest of the country was left to the nomadic tribes of Puelche and Tehuelche who hunted the fleet-footed guanaco and the rhea (a kind of ostrich) with their characteristic implement, the bola—consisting of two stones tied together with a thong. When the tribes adopted horses and firearms from the white men, the hunting range was greatly increased; but the increased capacity to kill the wild game soon destroyed the food supply, and the region would have become uninhabitable had it not been for the white men's cattle, stolen from the ranches along the Plata shore. The sparse population of treacherous natives was finally all but wiped out in a series of vigorous military campaigns between 1879 and 1883.

After the Indian wars came the chief period of colonization in Patagonia. When the period began the only established settlements were Carmen de Patagones, Punta Arenas, and Colonia Sarmiento. As soon as the menace of Indian attack had been eliminated, however, new colonists began to move into the region. The pioneers included people of many European nationalities, especially Welsh, Scotch, and English. Settlement spread into Patagonia along three chief routes. From the Humid Pampa at Bahía Blanca one stream of settlement spread southward along the coast, and inland up the canyons. By 1890 the coast as far south as Puerto Deseado had been occupied. Meanwhile another stream of colonization was advancing north from the Chilean port of Punta Arenas. Sheep were brought to the Pre-Andean Depression through Punta Arenas about 1878, and the development of sheep raising in this

[2] T. H. Holdich, *The Countries of the King's Award*, London, 1904.

district was especially rapid between 1885 and 1892. Settlers from Punta Arenas also pushed eastward along the Strait and into Tierra del Fuego, meeting the settlers from the north in the vicinity of Santa Cruz shortly before the beginning of the twentieth century. A third route of colonization led southward from Neuquén into the northern part of the Pre-Andean Depression, past Lake Nahuel Huapí, a movement which was supported in part by people who came from Chile. In addition, the Welsh settlement at Colonia Sarmiento, established in 1865, sent out, in 1888, a new colony which founded Diez y Seis de Octubre. The discovery of oil in 1907 led to the development of a small settlement at Comodoro Rivadavia, which is still Argentina's chief oil field. Many different European nationalities, as well as Argentines and Chileans, are now represented in the population of Patagonia.

Stock Raising

Most of Patagonia is devoted to sheep-raising; and sheep-raising is a way of life which supports only a very sparse population (Maps 58 and 59). The land is divided into ranches which are measured by thousands of square miles. On these ranches the few people are clustered about the ranch headquarters which are usually located in the shelter of a canyon where water is available. Very little irrigation is practiced in these places, and when small bits of land are irrigated, it is usually to provide feed for the horses. The concentration of sheep around the headquarters during the shearing and dipping periods creates a serious problem of overgrazing. The population density in the range country is very low, for on a ranch of some ten thousand square miles there is employment for not more than one hundred men.

The little ports along the coast are used for the shipment of wool. Most of the time there is little activity at these places, and little traffic on the railroads which connect them with the interior. But after the shearing period, when the wool begins moving to the coast, there are a few months when the shipping facilities are kept busy. From the ranch headquarters the wool is carried by wagon or motor truck to the nearest railroad. As rapidly as possible the wool is moved to the ports, where small coasting steamers carry the product to the big wool depot at Buenos Aires.

Very little of Patagonia is used for the grazing of animals other than sheep. Where the rainfall is somewhat heavier along the Andean piedmont and where there is a narrow belt of steppe grass (Map 57) physical

conditions are not unsatisfactory for cattle. Yet sheep are more important than cattle in the steppe-country inland from Punta Arenas and also in Tierra del Fuego around Ushuaia, the world's southernmost town. Only in the northern part of the Pre-Andean Depression between Neuquén and Diez y Seis de Octubre is cattle ranching of major importance.

The River Oases

The only cropland in Patagonia of any importance is to be found along the exotic rivers—the Colorado, the Negro, and the lower Chubut. The valley of the Santa Cruz is too cool for crops. Simple irrigation works make possible the cultivation of crops on the valley floors, which, being some one to three hundred feet below the plateaus, are sufficiently protected from violent winds. Alfalfa is the chief crop, and along the Río Negro between Neuquén and Viedma, and in the district between Rawson and Puerto Madryn there are small concentrations of cattle. In terms of animal units (seven sheep being the equivalent of one head of cattle) cattle are actually more numerous in these districts than sheep. The animals are fattened on the irrigated alfalfa before being shipped to the Humid Pampa—an arrangement quite similar to that of the shipment of western range cattle to the Corn Belt in the United States.

Meanwhile a new activity has appeared in the Río Negro oasis. Between 1910 and 1921 the Argentine government and a private railroad company joined to finance the construction of modern irrigation works including dams, reservoirs, and canals on the Río Negro and its tributaries. About 148,000 acres were thus made available for crops, and were laid out in small properties of 250 acres each. Alfalfa is still the chief crop of this area in terms of acreage, but vineyards and fruit orchards have been added, creating an oasis district very similar to Mendoza. In fact the wine grapes of the Neuquén district are said to be superior to those from the older oases farther north. Since 1932 the Río Negro valley has become Argentina's chief pear-producing district.

By 1935 some 70,000 acres were occupied by settlers in this new irrigation project. There were about 40,000 acres of alfalfa, 17,000 acres of vineyards, and 11,000 acres of pear orchards—all cultivated by a little over two thousand farmers. A considerable expansion of pear orcharding is technically possible, but such expansion must await the solution of the problems of international trade since almost all of the Argentine pear production was marketed in Europe prior to the beginning of the Second World War.

SOUTHERN SOUTH AMERICA
PACIFIC
OCEAN
ATLANTIC
OCEAN
COMODORO RIVADAVIA
ARGENTINA
CHILE
LAND USE
LIVESTOCK RANCHING WITHOUT AGRICULTURE
LIVESTOCK RANCHING WITH AGRICULTURE
LIVESTOCK RANCHING WITH AGRICULTURE – IRRIGATED
FOREST PRODUCTS
COMMERCIAL GRAIN AGRICULTURE
SPECIALIZED HORTICULTURE
COAL
PETROLEUM
0
SCALE
200
MILES
74°
70°
66°
62°
40°
44°
48°
52°
56°

Map 58

SOUTHERN SOUTH AMERICA
CONCEPCIÓN
ÑUBLE
LA PAMPA
NEUQUÉN
ARAUCO
BÍO-BÍO
CAUTIN
VALDIVIA
RÍO NEGRO
CHILOE
CHUBUT
AYSEN
SANTA CRUZ
MAGALLANES
POPULATION
URBAN
LESS THAN 100,000
RURAL
EACH DOT 1,000
TIERRA DEL FUEGO
0 SCALE 200
MILES
74°
70°
66°
62°
40°
44°
48°
52°
56°

Map 59

In the course of some sixty years, then, Patagonia has gone through a sequence which resembles the history of settlement of other outlying parts of Argentina. The advance of the pioneer colonists after the Indian Wars brought Patagonia, little by little, into the larger hinterland of Buenos Aires. The first settlement was based on the grazing of animals, and even now the greater part of Patagonia is utilized only for the production of wool. Then came the appearance of spots of commercial farming, located in the places most easily accessible to Buenos Aires. During the last decade the producers of the new commercial crops have faced severe financial difficulties due to overproduction and to the dislocation of international trade. Today the destiny of Patagonia is as closely tied to Buenos Aires as is that of the outlying regions of the North and the Northwest.

THE HUMID PAMPA—PHYSICAL CHARACTER

A vast grass-covered plain can, in its own way, be as spectacular as snow-capped mountains or wind-ruffled lakes. No European experience prepared the early Spanish colonists for the boundless monotony of billowing grasses which greeted them on the Paraná-Plata shore. For days they could travel without encountering features distinctive enough to vary the scene: repeated endlessly were the views of tall, plumed grasses, or of coarse rushes in the marshy spots, whispering and rustling in the shifting winds which were almost never still. And through the haze of wind-borne dust the sunset colors were splashed brilliantly across the skies, or reflected, blood-red, in the tawny waters of the Plata.

Although the Spaniards found this region covered with tall prairie grass, it is not improbable that the landscape had already at that time suffered an important modification of its natural condition. Schmieder arrives at the conclusion that the prairie had replaced an earlier scrub-forest cover as a result of fires lighted by the Indians (140). To the west the land was covered with the monte, an impoverished continuation of the tropical scrub forests of the Chaco. The monte is composed of deciduous broadleaf scrub trees and bushes with a marked xerophytic character. The Argentines distinguish between a *monte alto*, which grows in the wetter places and which includes trees 25 to 30 feet in height, and *monte bajo*, in which the plants are more widely spaced and seldom more than 10 or 12 feet in height. Essentially the formation is a tree-steppe, for between the trees there is a cover of short grass. According to Schmieder the monte was formerly much more widespread,

perhaps covering the whole of the Humid Pampa. The tall bunch grasses of the prairie could survive the fires set by the Indians, which seem to have had the effect, before the arrival of the Europeans, of pushing back the monte border farther and farther toward the dry west (Map 61).

The Climate

The rainfall on much of the area of the Humid Pampa is sufficient for the support of trees—indeed the many trees which have been planted around the estancia headquarters since the agricultural conquest have survived without difficulty. At Buenos Aires the average annual rainfall is about 37 inches, and over the whole northeastern section of the region the average is only a little below 40 inches. In this zone, also, the amount is very evenly distributed throughout all months of the year. The amount of rain decreases toward the southwest, dropping to 21.5 inches at Bahía Blanca, and to about 16 inches along the dry margin of the Humid Pampa. The seasonal distribution shows more and more of a concentration in the summer (December, January, and February) as one proceeds westward. At Córdoba the driest month (June, 0.1 in.) has very much less than the rainiest month (February, 5.4 in.).

The dependability of rain is a factor which has become critical since the spread of agriculture. The country around Rosario and Pergamino (Map 60) suffers very rarely from drought. This seems to be an "island" of dependable rainfall, however, for dry years come more frequently as one proceeds away from Rosario in any direction. At Pergamino, for instance, located a short distance south of Rosario, an examination of the rainfall record for the period from 1900 to 1924 shows that the two summer months of December and January together received at least six inches in all but three of the twenty-five years. At Rufino, on the other hand, only 125 miles southwest of Pergamino, this amount failed to come in ten years out of twenty-five; and during the same period Buenos Aires received less than this amount of summer rain in nine of the years. The dependability of the summer rain, which has become a matter of critical importance because of the necessities of the maize crop, decreases also toward the north. The greatest rainfall uncertainty is found in the dry lands to the west.

The Humid Pampa may be described in general as a region of mild winters and hot summers. The growing season between killing frosts varies from about 300 days along the Paraná-Plata shore to about 140 days south of Bahía Blanca. Despite the annual frosts—which, inci-

CÓRDOBA
RÍO SEGUNDO
SANTA FE
PARANÁ
SALTO
PAYSANDÚ
RÍO TERCERO
RÍO CARCARAÑA
RÍO CUARTO
ROSARIO
RÍO PARANÁ
RÍO URUGUAY
FRAY BENTOS
PERGAMINO
RUFINO
JUNIN
MERCEDES
COLONIA
BUENOS AIRES
RÍO DE LA PLATA
LA PLATA
RÍO SALADO
PELLEGRINI
AZUL
TANDIL
SA. DEL TANDIL
SA. DE LA VENTANA
MAR DEL PLATA
BAHÍA BLANCA
ATLANTIC OCEAN
THE HUMID PAMPA
SURFACE CONFIGURATION
FLOODPLAIN
HILLY LAND
TABLELAND
THE PAMPA
NORTHEAST PAMPA RIM
SALADO SLOUGH
ZONE OF MIDDLE PAMPAS
ZONE OF TOSCA
BARRANCA
LOCATION OF MAPS 72 & 73
0 SCALE 100
MILES

MAP 60

THE HUMID PAMPA
NATURAL VEGETATION
PRAIRIE
SCRUB FOREST
MONTE
MONTE-PRAIRIE TRANSITION
SCRUB-PRAIRIE TRANSITION
ATLANTIC
OCEAN
SCALE
0
100
MILES
64°
62°
60°
58°
32°
34°
36°
38°
40°

Map 61

dentally greatly reduce the number of insect pests as compared with the regions farther north—the winters are mild, and the absence of deep or long continued snow cover makes agricultural and pastoral operations possible in the open throughout the year. The summers are especially hot in the northwest, but toward the southeast they are cooler. The southeastern part of the region around Mar del Plata and Tandil are distinctly cool—so cool, in fact, that grains do not thrive in this section. The cool summers are due to the presence of the cool Falkland Island Current.[3]

A comparison of the average temperatures of Buenos Aires and of cities in the eastern part of United States is instructive. Buenos Aires has about the same temperature in January (73.6°) as does New York in July (73.5°). During the winter the average temperature of the coldest month at Buenos Aires (July, 48.9°), is about the same as that of the coldest month at Charleston, South Carolina (January, 49.8°).

Buenos Aires and the Humid Pampa also share with eastern North America the characteristic of variable weather. Cold air masses (anticyclones) from the south cross the Argentine plains toward the northeast or north, bringing cool or cold weather and clear skies. Along their fronts they meet and force up the warm, humid and relatively light air of tropical origin, thereby producing clouds and rain. This interaction of air masses is similar to that which takes place in North America where cold air from Canada moves southeastward toward the Gulf of Mexico or the warm Atlantic Ocean, meeting as it advances the more buoyant air which originates at lower latitudes. Along the front of advancing cold air masses the light tropical air forms whirls or eddies which appear on the weather maps as "lows" or cyclones, rotating in North America in a counter-clockwise direction, in South America in a clockwise direction. Along the immediate cold front especially violent local up-currents of warm, moist air produce thunderstorms. The territory around Buenos Aires is noted for the violence of its thunderstorms and the magnificence of its displays of lightning. During the passage of these various kinds of air masses the weather changes from cloudy, warm, muggy, and depressing, to clear, cool, dry, and bracing. The people of the Humid Pampa distinguish between the *norte*, or sultry north wind, and the *pampero*, or invigorating wind which comes to them across the Pampa.

[3] In the Köppen system most of the Humid Pampa is classified as Cfa. From Tandil to the southeast coast around Mar del Plata, the symbol is Cfb. Córdoba is Cwa. The BSk climate borders the Cfa on the dry margin, extending in a half circle from the southern part of the Córdoba Hills to the coast south of Bahía Blanca (Map 10).

Soil and Surface

The wind is a very important element in the physical character of the Humid Pampa. Although less violent and blustering than the wind of Patagonia, there are times when the pampero may blow with considerable force, and when the air is filled with dust whirled aloft from the dry surfaces to the west and south. In fact, this burden of fine rock particles carried by the wind, picked up in the arid west and dropped in the more humid east, is responsible in large measure for the character of the soil and the surface of the Humid Pampa.

The Argentine plains are actually composed of a deep accumulation of loose material resting on top of a hilly surface of granite and other ancient crystalline rock. This buried surface is a southward continuation of the rocky hill country of Uruguay (Map 6). Rock outcrops are common throughout Uruguay as far as the northern shore of Plata. South of the Plata, on the other hand, the hilly surface is deeply buried. At Buenos Aires, for example, the bedrock lies beneath 985 feet of river alluvium and wind-blown dust. A few of the more prominent features of the buried surface still protrude above the cover; the Sierra de Córdoba, sometimes called the Córdoba Hills (5,000 ft.), the Sierra del Tandil (1,600 ft.), and the Sierra de la Ventana (4,000 ft.) form conspicuous hills or low mountains rising above the plains. South of the Sierra de Córdoba a ridge of rock rises to within a short distance of the surface, continuing the trend of these hills southward to the vicinity of the Río Colorado (its position can best be estimated on Map 6). This ridge forms an important and sudden break between the land of abundant ground water to the east, and the dry land to the west where the ground water is far below the surface. The absence of a wide zone of transition, such as characterizes the dry margins of most of the world's humid grasslands, may be due in part to this little-known feature of the buried surface. Most of the Humid Pampa is so deeply mantled with unconsolidated beds of fine sand, clay, silt, and wind-blown dust, or *loess*, that the underlying rock is entirely obscured. Quite unlike Patagonia the soil of the Humid Pampa is entirely free of stones or pebbles. Here is a country where gravel is unknown.

The apparent monotony of the surface is suggested in part by the absence of important relief features except for the three Pampa sierras. The shallow mud flats of the Plata are bordered by a steep bank, the *barranca*, which rises abruptly about one hundred feet above the river level. The barranca is especially steep where the Río Paraná washes

against its base between Rosario and the junction with the Uruguay. Above the barranca the surface appears to be almost level, and only the presence of marshy spots, or the use of the surveyor's instruments, reveals the slight irregularities which exist. There is a zone of varying width along the Paraná-Plata shore in which narrow, flat-bottomed ravines have been cut back from the river into the plain. Beyond the heads of these short streams, however, there is remarkably little relief. The 150-meter contour line (about 500 ft.) is more than 130 miles west of Buenos Aires; only as one approaches the protruding sierras does the slope increase perceptibly—rising, for instance, to an elevation above sea level of about 1,300 feet at the city of Córdoba. On such a nearly flat surface the strings of live sand dunes which appear in certain places on the Pampa stand out like mountains.

Physical Divisions

Yet the surface and soil of this region are, in reality, anything but uniform. Many of the differences which exist from place to place are, to be sure, not directly apparent in the landscape, but they are of such great significance in terms of agricultural or pastoral use that the common description of the region as one of monotonous uniformity is a most misleading one. Unfortunately the modern soil mapping, on which the physical subdivisions of the Humid Pampa will some day be based, has not yet been undertaken. Pierre Denis suggests the probable subdivisions, but the actual limits, as set forth tentatively on the map (Map 60), will require much correction in detail when a soil inventory is available.

The *Northeast Pampa Rim* is that part of the Humid Pampa which lies between the barranca and the marshy zone along the Río Salado.[4] It is fretted along the Paraná-Plata by the short ravines previously mentioned. From the crest of the barranca it slopes very slightly toward the southwest, merging gradually with the zone of sloughs along the Río Salado. For the most part the district is composed of fine, dark-colored soils which stand high enough above the water table to be well drained.

Southwest of the Pampa Rim, and extending along the course of the Río Salado, there is a zone which we may call the *Salado Slough*. During

[4] The reader should particularly note the presence of at least three rivers in Argentina named *Salado*. There is the Río Salado which crosses the southern part of the Chaco from the neighborhood of Tucumán to Santa Fé; there is the Río Salado which drains the zone of playas east of Mendoza, and which in time of high water enters the Río Colorado; and there is the Río Salado on the Humid Pampa, to which reference is made here.

wet periods the rise of the water table converts a large proportion of the surface into shallow, reed-filled lakes, inhabited by innumerable water birds. For much of the year, however, the Salado Slough is composed of only a line of swamps with the water table at or slightly below the surface, and the sluggish current of the Río Salado is lost among the coarse grasses. Because of the abundant rainfall the swamps are not salty.

Beyond the Salado Slough, and west of the Pampa Rim, lies a district which may be designated the *Zone of the Middle Pampas*. The surface of this zone is composed of imperceptible swells of higher ground, interrupted irregularly by shallow depressions. For many miles east of the base of the Sierra de Córdoba the denudation of these mountain remnants has built a wide zone of somewhat coarser material which rises gradually toward the steeper rock slopes of the mountains. In other parts of the Middle Pampas there are strings of sand dunes.

Most of the drainage in this zone is underground. Except for a few streams which descend from the three Pampa sierras there is no running water. The rain may for a time cause shallow lakes to fill the depressions, but little by little the water is absorbed in the soil and finds its way toward the sea by underground seepage. In the low places drainage is a serious problem, especially in the wetter eastern part of the district. Of five streams, moreover, which descend from the Sierra de Córdoba, only two, the Río Tercero and the Río Cuarto, uniting in the Río Carcarañа (Map 60), have enough water to continue across the plains to the Paraná: the others disappear in the swamps, or, in times of flood, reach the salty Mar Chiquita (Map 48). Similarly, only one of the streams descending from the Sierra de la Ventana is able, even in time of flood, to reach the Salado Slough. Throughout the district the ground-water table lies near enough to the surface to be reached easily by the roots of the alfalfa plant. Deeper and purer supplies of water are found for drinking purposes between 100 and 500 feet down and are pumped to the surface by the many windmills which, today, form a common feature of the Pampa landscape.

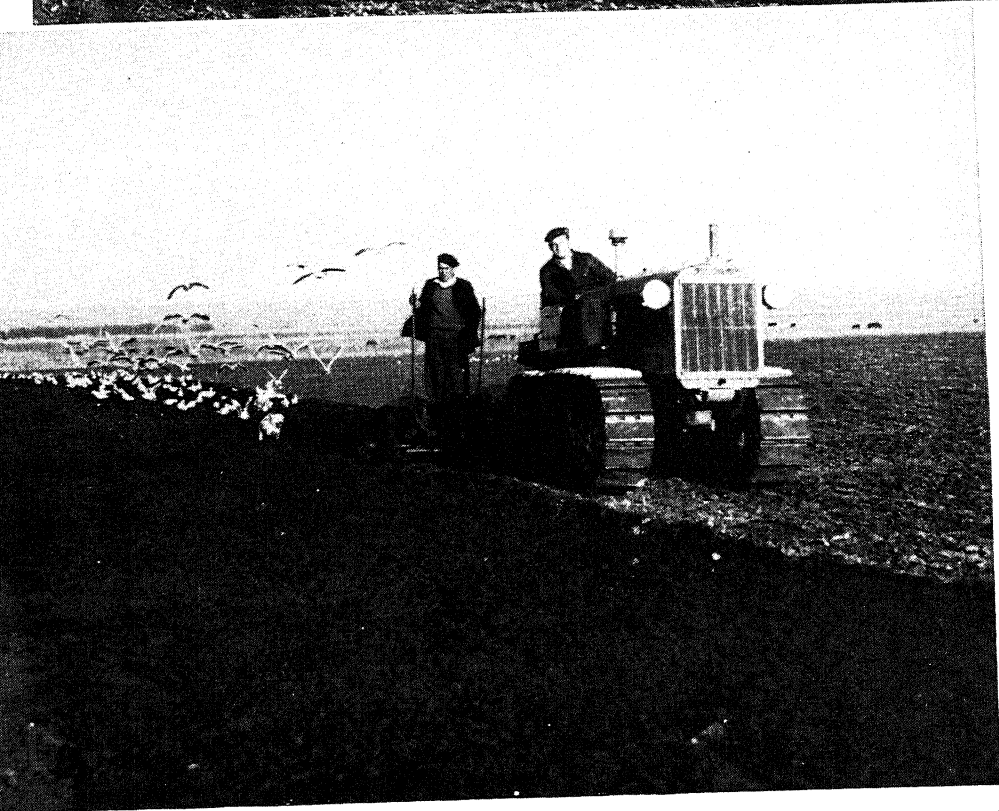
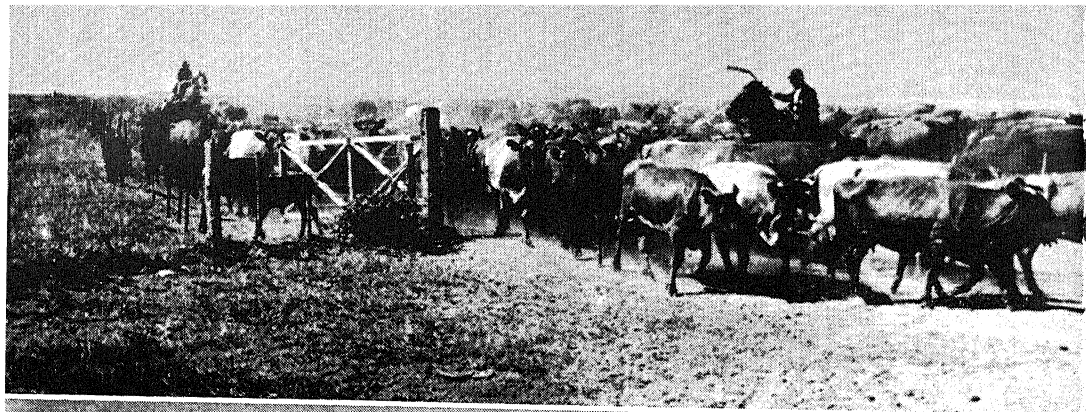
This middle district is bordered on the southwest by the *Zone of the Tosca*. The tosca is a stratum of indurated lime, possibly derived from the concentration in the lower layers of the soil of the calcareous material dissolved in the surface layers by the percolating waters. In the wetter parts of the Humid Pampa this material is carried away with the ground water; but with the increasing aridity of the southwest the percolating water does not regularly penetrate to the ground-water table, and the burden of salt is redeposited below. The origin seems to be similar to

that of the calcareous accumulations of the semiarid grassland soils of North America or Russia; but in Argentina the lime layer is much thicker and more continuous. The tosca layer is generally covered by a thin mantle of soil material, but there are parts of the district where the tosca is exposed at the surface: south of the Sierra de la Ventana, and east of Bahía Blanca there are dry, steep-sided ravines, some two hundred feet deep, which have been excavated below the tosca, leaving the limestone layer exposed along their cliffed sides.

THE TRANSFORMATION OF THE LANDSCAPE

These various subdivisions of the Humid Pampa, however, were not apparent to the early Spanish colonists. People become aware of regional differences in terms of the uses they wish to make of the land. The individuality of the Humid Pampa has been brought out in the course of agricultural settlement: for a nonagricultural people with scrubby, half-wild cattle, the latent contrasts within the area which have been made prominent only in terms of alfalfa, wheat, and maize, could scarcely have been noticed. Even the tall bunch grasses of the prairie could not have seemed radically different from the grassy and tree-scattered monte to the west, for the animals did about as well on one as on the other. If this region is today one of the world's chief food-producing areas, it has become so because changing techniques and changing economic conditions made the more recent phases of its transformation possible.

Settlement before 1853

When the Spanish colonists re-established themselves along the Paraná-Plata shore they had come downstream from Asunción. Santa Fé was founded in 1573; and the site of Buenos Aires was reoccupied in 1580. The first colony at Buenos Aires had failed largely because of the jealousy of the people of Asunción who refused to permit sufficient support to reach it. When the site was reoccupied by people from Asunción, the chief purpose was to provide a place where ships, after the long voyage from Spain, could find fresh provisions and water before starting on the long and difficult trip upriver to Paraguay. Buenos Aires, moreover, could stand guard over Spanish interests at the mouth of the Plata. A century later, in 1680, when the Portuguese founded Colonia on the opposite shore of the Plata, the settlement at Buenos Aires became an important outpost in the Spanish and Portuguese struggle for the control of the Plata estuary.

The picture above shows men hilling corn at the government's Agricultural Experiment Station near Pergamino. In this flat section of the Humid Pampa, a grove of trees planted around an estate headquarters, or even a straw stack, is a conspicuous feature. (Courtesy of the Pan American Union.) In the lower picture the land is being plowed with a tractor during the fall, preparatory to planting wheat. In the background is seen one of the Pampa sierras. The birds are enjoying a meal. (Courtesy of the Allis Chalmers Company.)

The whole rural economy of Buenos Aires Province is based on the use of land for pasture. Herds of fine cattle, such as the one seen in the picture above, are the main source of wealth to the landlords. (Courtesy of the Ministerio de Relaciones Exteriores.) Prosperity in this province manifests itself in fine homes. The lower picture shows the residence, built in the style of an English manor house, of the wealthy owner of an estancia just outside Buenos Aires. It is obvious that money was spent freely to beautify this place. (Courtesy of

The Paraná-Plata shore, however, was not a very attractive place for the Spaniards of that period. In the district which is called the Northeast Pampa Rim, the land was divided into huge estancias, and herds of horses, mules, and cattle were pastured on the unfenced range with a minimum of attention from the owners. A line of forts was placed along the Salado Slough to guard the scattered estancias and the few towns from the raids of Indians. The forts, however, were only partly effective, for even after the middle of the nineteenth century the Indians on certain occasions penetrated the settled country northeast of the Salado and raided the outskirts of the towns.

Within the district of the Pampa Rim where the pastoral settlement was concentrated (Map 64), the Humid Pampa underwent an important and rapid transformation. For the native guanaco and rhea the Europeans substituted herds of domestic animals; and with these animals they introduced, perhaps without intention, the seeds of European grasses. The new species of grass spread rapidly throughout the area of the settlements. In an amazingly short time the native tall bunch grass, the *pasto duro*, was replaced by a dense lawnlike growth of European grasses which formed a thick sod, the *pasto tierno*. A notably sharp vegetation boundary was developed along the Salado where no such boundary had existed before. Travelers of the early nineteenth century commented on the great difference to be observed between the tall bunch grasses of the Indians' hunting ground southwest of the Salado, and the rich, green carpet of well-cropped grasses in the pastoral zone (141).

The people who owned the estancias and the hired gauchos who performed the necessary work on the estates were not an agricultural people. When wheat farming made its belated appearance near the end of the eighteenth century it was carried on by tenants, and was scorned by the vast majority of the settlers. Wheat was raised in the flat bottoms of the ravines which drain to the Paraná and the Plata, and on the Pampa in a semicircle some twenty-five miles in width around Buenos Aires. Late in the eighteenth century, flour was actually exported to the purely pastoral region of Mesopotamia.

Meanwhile the Río Salado remained a sharply defined cultural boundary separating the Europeans from the Indians, and the pasto tierno from the unchanged pasto duro. Convoys of wagons crossed the Humid Pampa to the southwest in search of salt, but there was little interest in laying out estancias in the vast territory between the Salado and Bahía Blanca. This lack of attention to what has been described as one of the world's most favorable natural pasture lands cannot be laid to the

hostility of the Indians, for the gauchos were not the kind of men to be stopped by the attacks of scattered tribes of savages. The fact is that the owners of the cattle estates could place little value on this Indian country: there was no opportunity to develop the latent agricultural possibilities, for the world was not ready for such development; and from the point of view of the pastoralist whose mules were to be driven inland by way of Tucumán to the market at Salta there was plenty of good grazing land west of Rosario, and the country beyond the Salado was too remote to be interesting.

In the period between the declaration of independence from Spain (1816) and the drafting of the federal constitution (1853) the minds of men in Argentina were for the most part focused on problems other than those of settling the land. Aside from some attempts to plant colonies on the coast of Patagonia, and some southward expansion of the cattlemen along the eastern side of the Humid Pampa, the frontiers of occupied country remained little changed while the great issue of the day—centralism versus federalism—was being fought out. During the long domination of the dictator Rosas (1829–1852) the strong central authority of Buenos Aires was imposed on the outlying parts of the country with an iron hand. Rosas was overthrown in 1852. When, in 1853, the federal system was victorious and a degree of political stability was attained, the stage was set for those profound changes which have produced modern Argentina. But the essential features inherited from the period before 1853 which have colored the period since that date must not be overlooked. Argentina advanced toward the modern period with four fundamental characteristics: first, a scanty population—only about 900,000 in 1800, and 1,200,000 in 1852; second, a people almost exclusively interested in horses, cattle, and sheep and not at all in agriculture; third, an abundance of free land of first-rate quality for grazing and grain farming; and fourth, the tradition of the large private estate.

The Beginning of the Modern Period

There was no precedent for the transformation which followed. The Argentine grasslands, together with the other mid-latitude grasslands of the world, passed through a spectacular and unique period of development. The advance of the frontier of settlement across first-class agricultural lands, accompanied by the widespread prosperity brought by expanding markets and increasing land values, was a phenomenon characteristic of one period of economic history, and chiefly, too, of one kind

On the nearly level surface there is no need for cuts, fills, bridges, tunnels, or even for curves. In few parts of the world are construction costs lower.

The first railroad started operations in 1857. It ran for six miles in a straight line southwestward from Buenos Aires. Shortly thereafter a railroad was built along the old colonial mule route from Rosario to Córdoba and Tucumán. During the next few decades railroads were built out of all the leading ports of the Humid Pampa, usually running in straight lines toward indefinite—or impossibly distant—objectives. A few of these lines have actually been extended beyond the borders of the Humid Pampa, but most of them have not. By 1910 Argentina's central region was crisscrossed by a series of overlapping fans, converging on Buenos Aires, Rosario, Santa Fé, and Bahía Blanca (Map 62).[5]

The Argentines generally think of the Humid Pampa as being divided into four major zones, each zone served by the main line and branches of one of the large railroads. The whole southeastern part of the region constitutes the zone of the Ferrocarril del Sud, the main line of which runs southward from Buenos Aires, and which connects with La Plata, Mar del Plata, and Bahía Blanca. A second zone is formed by the main line and branches of the Ferrocarril Oeste, which runs southwestward from Buenos Aires. The third zone is a narrow one, served by the main line of the Ferrocarril de Buenos Aires al Pacífico, which runs westward from the capital through Junín to Mendoza. The fourth zone is that served by the Ferrocarril Central Argentino, which runs from Buenos Aires northwestward to Rosario, Córdoba, and Santa Fé.

These various railroad lines were not financed by the Argentines. Wealth among the *estancieros* was in the form of herds and land, not money or bank credits. After 1853, when foreign capital felt secure in Argentina, many investors in Europe saw opportunity for profit in this rapidly expanding region. Between 1880 and 1886 the flow of British capital into Argentina was especially strong; most of the railroads were built by British companies, they make use of British rolling stock, and they burn British coal. The meter-gauge line to Tucumán and the Northwest, however, was built by a French company.

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[5] The first railroad, and many of those which followed, were built on a broad gauge (5 ft. 6 in.)—a gauge adopted originally to fit rolling stock which the British had built for use in India but had sent to Russia for use in the Crimean War. There is no uniformity of gauge, however. Some of the lines are built on the so-called standard gauge (4 ft. 8½ in.), and some are built on narrow gauge. The line which runs from Buenos Aires through Córdoba and Tucumán northward to Bolivia was built on a one-meter gauge.

The New Estancias. The railroads paid good dividends to their stockholders; and to the people of Argentina they brought unheard-of prosperity in the form of booming land values. But the whole process of land settlement and of property division was fundamentally different from the process of settlement in the grasslands of the United States which was going on at the same time. In North America the small homesteader after 1862 was able to get a farm of one hundred and sixty acres practically free of cost. In Argentina, the land, even before the coming of the railroads, was already partitioned in large units and given to a favored few in government grants.

The spread of the large estates over the Pampa was rapid after 1853. The first advance across the Salado was made in the east. As early as 1875 the line of forts protecting the occupied part of the Pampa from the Indians had been pushed forward to the southern coast, east of the Sierra de la Ventana (Map 65). The Indians were finally eliminated from the Argentine scene in the wars of 1879–83, after which many of the officers of the army were given grants of more than one hundred thousand acres each. Soon after 1880 the last of the public domain on the Humid Pampa had passed into private hands.

The Río Salado suddenly lost its importance as a major culture boundary. After three centuries during which this line of sloughs had formed a frontier of European settlement and had become also a major vegetation boundary, one generation saw the established limits overrun. The only remaining evidence of this long stabilized feature is in the present predominant orientation of the property lines. Throughout the province of Buenos Aires, even to the south of Bahía Blanca, the roads and properties form an irregular rectangular pattern, running from northwest to southeast and from northeast to southwest—parallel and at right angles to the Salado, and to the Paraná-Plata shore (Map 66).

The Pastoral Base

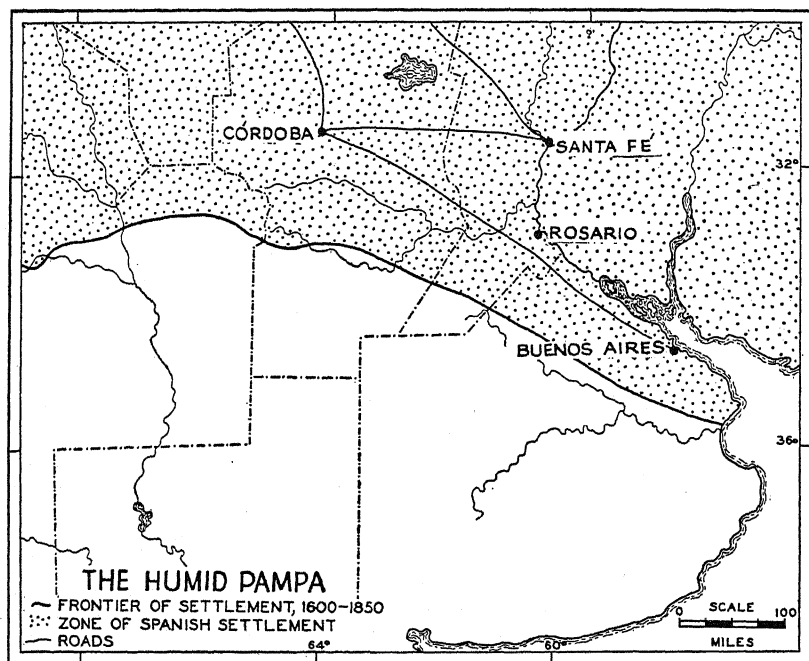
Life on the new estancias was still not agricultural. The owners were mostly Argentine creoles, men raised in the pastoral tradition, men whose chief occupation was the handling of herds of cattle, sheep, and horses, men for whom the surest road to prestige rested in the ownership of land. Foreign markets, as far as the landowners were concerned, meant markets for cattle. At first the herds were made up of the Argentine cattle, descendants of the scrub animals of the colonial period. They were permitted to run at will on the vast, unfenced range, and to breed without

CORDOBA
SANTA FE
ROSARIO
PERGAMINO
RUFINO
JUNIN
BUENOS AIRES
TANDIL
MAR DEL PLATA
BAHIA BLANCA
ATLANTIC
OCEAN
THE HUMID PAMPA
LAND USE
LIVESTOCK WITHOUT FORAGE CROPS
LIVESTOCK WITHOUT FORAGE CROPS, WITH COMMERCIAL WHEAT
LIVESTOCK WITH IRRIGATED FORAGE CROPS
LIVESTOCK, ALFALFA, WHEAT
LIVESTOCK, ALFALFA, MAIZE, AND FLAX
COMMERCIAL GRAIN AGRICULTURE
SPECIALIZED TRUCK AND DAIRY AGRICULTURE
ORCHARDS
SCALE
0
100
MILES
64°
62°
60°
58°
32°
34°
36°
38°
40°

Map 62

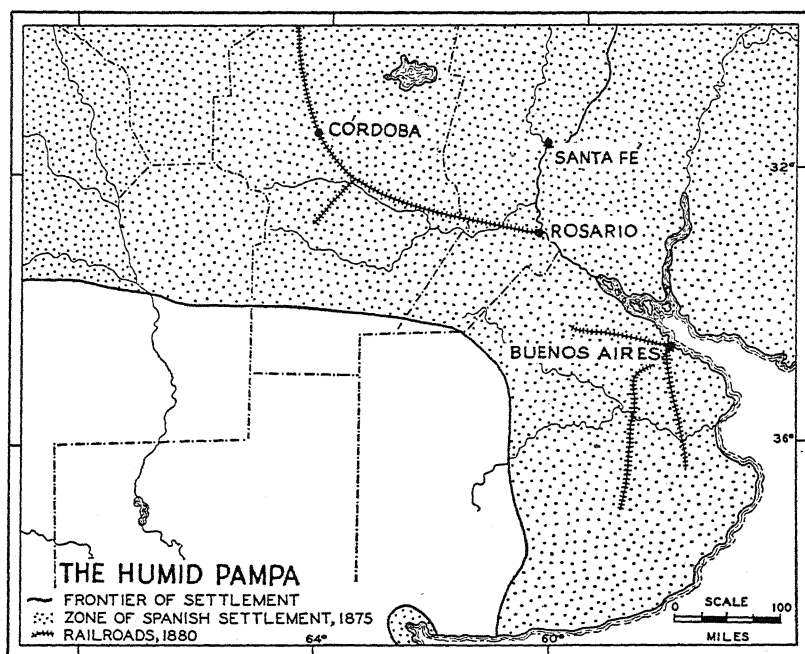
SANTA FE
ENTRE RÍOS
URUGUAY
CÓRDOBA
BUENOS AIRES
LA PAMPA
ATLANTIC
OCEAN
THE HUMID PAMPA
POPULATION
URBAN
OVER 1,000,000
MORE THAN 100,000
LESS THAN 100,000
RURAL
EACH DOT 1,000
SCALE
0
100
MILES

Map 63

care and without thought of quality. Such animals were good for the production of such things as hides, tallow, and salt beef; but the meat was lean and had a strong taste. In 1877 the first refrigerator ship made it possible to send frozen meat to England, but British taste would not accept Argentine meat. The result was the importation of high-grade beef cattle from England, and the careful breeding of these animals on

MAP 64

fenced-in pastures. This important shift from scrub cattle to carefully selected animals took place between 1880 and 1900.

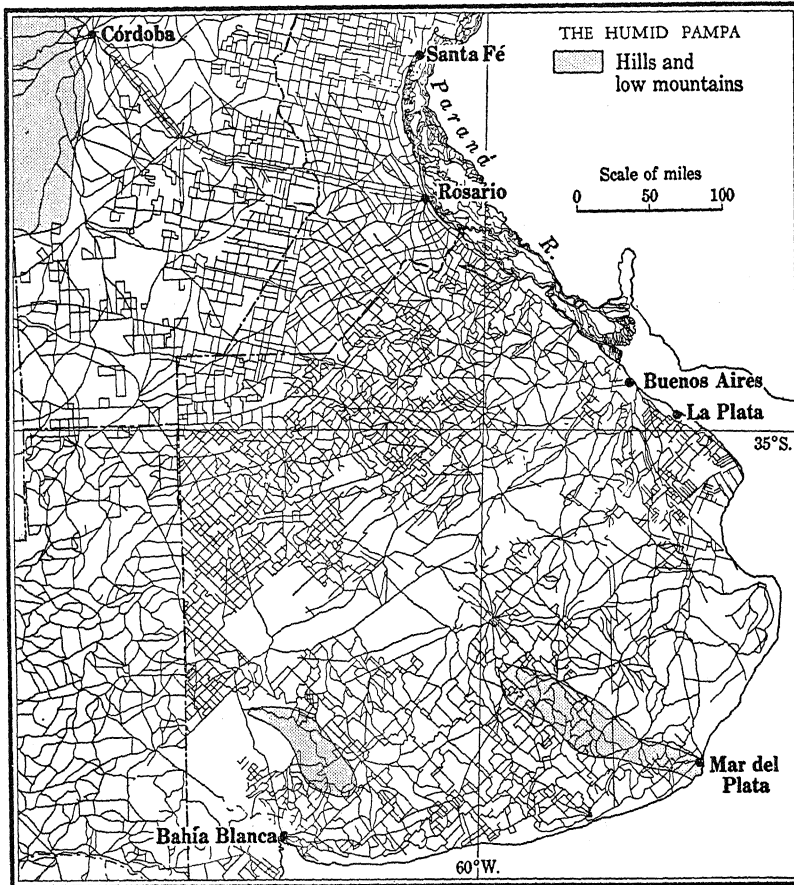
The change in the pastoral technique created many other changes in the relation of people to the land, in the productivity of the land. The scrub cattle could get along well enough on the poor grasses of the monte, and they could thrive on the pasto duro of the untamed prairie. They could endure the insect pests of the Chaco, or the long overland marches with little feed and water. But not so the big clumsy beef animals bred from English stock. Because the new cattle could not survive the ravages of Texas fever, for the first time the southern limit of the country infested with ticks, or *garrapatas*, became a significant boundary (Map 67). But in addition to requiring tick-free pastures, the new

animals required a better source of feed than the uncultivated pastures could supply, even the pasto tierno. Rapidly, after 1890, the estancieros came to realize the necessity of shifting from a grazing industry based on uncultivated pastures to one based on a cultivated crop. Alfalfa was the feed crop they adopted, and on the Humid Pampa alfalfa did exceptionally well. But alfalfa had to be planted on plowed land, and then cut and

MAP 65

fed to the animals. These practices required the services of many more workers than had ever been needed to care for the wild scrub animals of the earlier period. At last the estancieros wanted immigrants.

Immigrants

Other people in Argentina had felt the need for more settlers long before the estancieros did. Juan Bautista Alberdi (1810–84), one of the foremost political philosophers of Latin America, was engaged in writing his famous treatise on a proposed basis of political organization for the Argentine Republic while the country itself was in the grip of the tyrant Rosas. "The enemy of union," wrote Alberdi, "is not Rosas, but distance." He was one of the first to recognize that to govern a land it is

necessary to populate it, a principle which, in this book, forms the basis for the contrast between total and effective national territory. Alberdi and many of the other important men of his time never ceased to emphasize the necessity for stimulating the immigration of Europeans. That

MAP 66. THE ROADS OF THE HUMID PAMPA.
(From *Mapa de Comunicaciones de la República Argentina*, Instituto Geográfico Militar.)

Europeans actually came in large numbers to the Argentine Humid Pampa distinguishes this region as well as the nation of which it is the economic center from the other nations and regions we have discussed up to this point.

In 1856 the first group of agricultural immigrants was brought from Europe. This group consisted of 208 families of German- and French-

speaking Swiss. Since the land in the more accessible parts of the Humid Pampa was already in private hands, this colony was established on land granted by the Province of Santa Fé, and located a short distance northwest of the city of that name. The first colony, known as Esperanza, and developed largely through the initiative of a private citizen, Aaron Castellanos, was soon bordered by a number of other similar colonies of European immigrants. After 1882 the district around Santa Fé became one of the first important sources of wheat (132).

The tide of immigration began to rise more and more rapidly. The total population of the country which had been 1,200,000 in 1852, increased to 2,500,000 in 1880, and of these 173,000 were people born in Europe. The first peak year of immigration was reached in 1889, when 218,744 second- and third-class passengers came to Buenos Aires. In every year, however, there was a considerable return current of emigrants who were either discouraged and homesick, or successful and ready to return to the homeland to settle down in higher social positions. The immigration figures for 1889 must be balanced against 40,649 emigrants. The depression and panic of 1890–91 resulted in a net loss of population in Argentina, but thereafter the tide swelled rapidly again, to advance with few setbacks to the peak year of 1913, when 302,047 entered and 156,829 left. Between 1857 and 1900 approximately 2,000,000 immigrants arrived in Buenos Aires and 800,000 departed—giving a net increase of 1,200,000. After the First World War immigration set in again, reaching another peak in 1929, when there were 427,455 arrivals and 348,234 departures. During the 73 years between 1858 and 1930 the total immigration amounted to 6,300,000 people.

Meanwhile the racial character of the Argentine population was being profoundly altered by this stream of new Europeans. The composition of the population in 1914 and again in 1935 is presented in the following table:

Racial Character of the Population of Argentina*

	1914	1935
Born in Argentina of pure European stock	5,185,000	9,480,000
Born in Argentina with traces of Indian or Negro stock	400,000	300,000
Born in Europe	2,300,000	2,500,000
Total population	7,885,000	12,280,000

* From A. E. Bunge, 111, p. 286.

The European immigrants whose arrival changed so radically the character of the Argentine people were largely of Italian and Spanish nationality. These two groups together make up almost 80 per cent of the newcomers. Between 1857 and 1924, of those who remained in the country, 1,300,000 were Italians and 1,025,000 were Spaniards. Represented also in the stream of immigration by substantial numbers were French, Germans, Austrians, Russians, British, and Swiss. Since 1930 there has been a marked increase in the number of people from eastern Europe, especially Poles.

Tenants and the Rise of Agriculture

The immigrants were desired by the landowners, we have said, because they were needed to plant and cut alfalfa for the high-grade beef animals. The native Argentines themselves were still interested, primarily, in breeding fine cattle and horses, and in providing these animals with adequate feed. The immigrants brought agriculture to Argentina, and agriculture was encouraged by the landlords as a by-product of the expansion and improvement of the grazing facilities. The most effective way to prepare the land for the planting of alfalfa was to rent it for a period of four or five years to tenants and to permit them, for a share of the crop, to raise wheat. The estancieros and their hired hands were neither numerous enough to undertake this work of cultivation, nor were they willing to do so. They were, however, anxious to secure tenants for their estates, and soon found that in addition to increasing their alfalfa acreage they could derive considerable profit from a share of the crops. The contracts obliged the tenants to plant the land with alfalfa and to move away after a specified number of years. The alfalfa fields then yielded well, giving as many as three cuttings a year, for five or ten years, after which new tenants would be secured, and the cycle repeated. Naturally the tenant homes were rude, temporary shelters, and the attachment of the agricultural workers to the land was loose and easily broken. Yet it was the tenant group which made the Humid Pampa one of the world's chief surplus food- and meat-producing regions.

With the rise of wheat farming to a place of major importance, the demand for more workers to take care of the peak load of the harvest season began to exceed even the supply of tenants. In November and December there was an insistent demand for field hands to work for wages on a temporary basis. In response there developed a regular seasonal migration of laborers who would come from Italy to Argentina in the

spring and early summer of the Southern Hemisphere, and who would return to Italy during the months from March to June to harvest the Italian wheat crop. Many of these *golondrinos*, or swallows, as they were called, made the trip between Italy and Argentina again and again. Since 1914, this form of seasonal migration has practically ceased.

Between 1853 and 1914 the great transformation of the Argentine Humid Pampa was accomplished. As more and more immigrants entered the country, the value of agricultural production mounted until at last the crops brought larger returns than the animals. In 1894 the three chief pastoral products together (wool, meat, and hides) made up 63 per cent of the total value of exports; but in 1903, for the first time, the value of the combined agricultural products (maize, wheat, and linseed) exceeded the value of the animal products. The immigrant farmers supplied the necessary labor to reshape the economic destiny of the region; but the Argentine landowners were the ones who profited most from the spectacular increase of land values.

AGRICULTURAL DIVISIONS OF THE HUMID PAMPA

The process of transformation which changed the Humid Pampa from an open range country of low productivity to a very productive commercial farming region resulted also in changing an area of apparent uniformity to one composed of distinctly differentiated parts. During the period since 1853, five different forms of land use have appeared on the Pampa in succession. These are: first, livestock ranching without agriculture; second, livestock ranching with forage-crop agriculture; third, commercial wheat farming; fourth, commercial maize and flax farming; and fifth, intensive truck and dairy farming and fruit orcharding. Each of these five forms of use has been adjusted somewhat differently to the physical background of climate, drainage, and soil, and to the economic background of proximity to market; and for this reason each of the five forms of use has occupied a somewhat different part of the Humid Pampa. Some parts of the region have been occupied by all the forms of use, one after the other; some parts of the region have never been occupied by more than one form of use. Today the Humid Pampa is anything but uniform.

The Humid Pampa is differentiated now into four major agricultural districts (Map 62). 1. The first one is the *Pastoral District*, located in the southeast between Mar del Plata and Tandil, and including small outlying patches on the Pampa sierras and in the wetter sloughs. In this

THE HUMID PAMPA
PERCENTAGE OF LAND AREA
IN PASTURE
1934-1935
80+
50-80
32°
CATTLE
TICKS
OF
50-
SOUTHERN
LIMIT
50-80
36°
80+
80+
80
SCALE
0
100
MILES
50-
80
AFTER P. O. NYHUS
U. S. DEPT. OF AGRIC.
64°
60°

MAP 67

THE HUMID PAMPA
AVERAGE YIELD OF WHEAT
IN BUSHELS PER ACRE
64°
60°
32°
17-20
36°
9-13
13-17
9-13
SCALE
0
100
MILES
6-9
AFTER P.O. NYHUS
U.S. DEPT. OF AGRIC.

MAP 68

THE HUMID PAMPA
AVERAGE YIELD OF MAIZE
IN BUSHELS PER ACRE
64°
60°
10
18
30
32°
36°
SCALE
0
100
MILES
AFTER P.O. NYHUS
U.S. DEPT. OF AGRIC.

Map 69

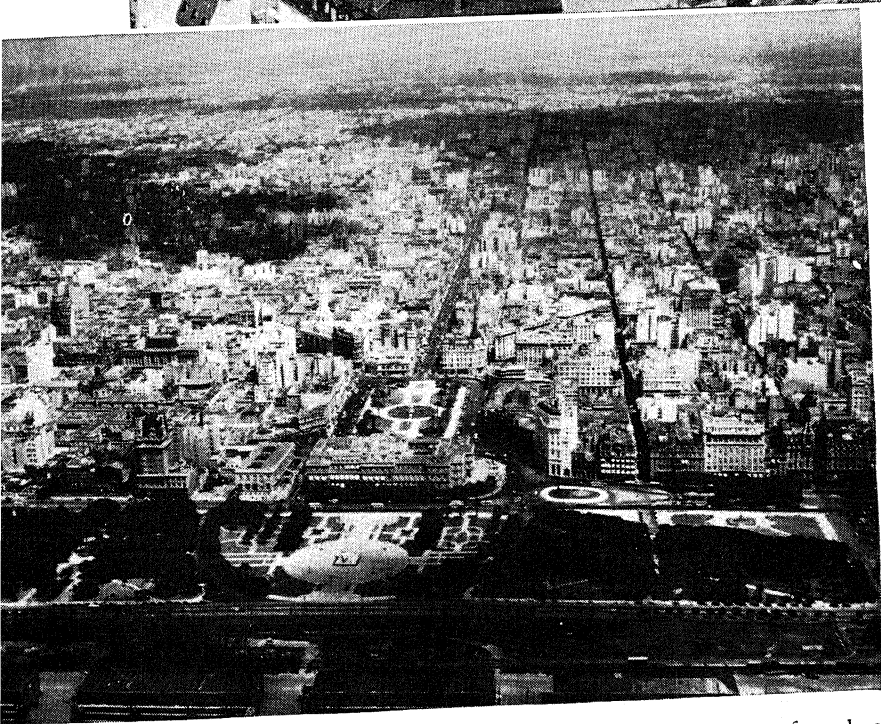
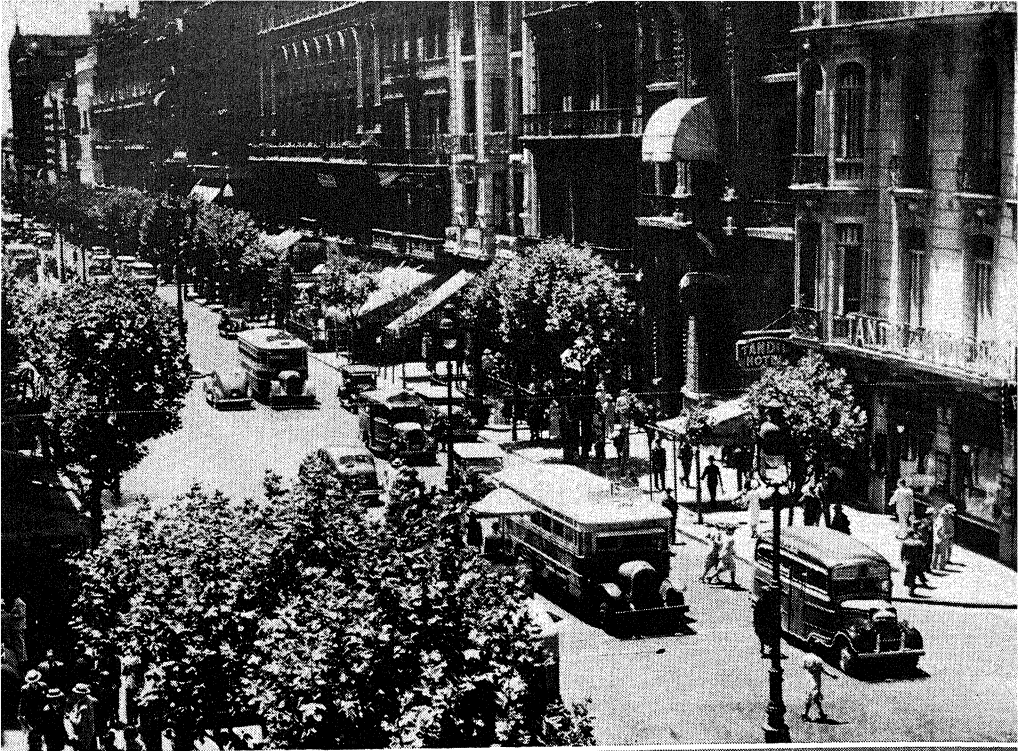
THE HUMID PAMPA
WHEAT YIELD IN PERCENTAGE
OF MAIZE YIELD
100 - 200
100-200
60-
100-200
60-100
200+
32°
36°
SCALE
0
100
MILES
64°
60°
AFTER P.O. NYHUS
U.S. DEPT. OF AGRIC.

Map 70

district most of the land is still devoted to livestock ranching without agriculture. 2. The second major division we shall call the *Alfalfa-Wheat District.* In it, alfalfa is the chief crop in terms of acreage, but the most important commercial crop is wheat. Between the Pastoral District and the Alfalfa-Wheat District which borders it on the west and north there are transitional areas which some students might prefer to recognize as separate divisions. In the zone of the middle Pampas (Map 60) there is a wide area in which, as one passes toward the west, larger and larger acreages of alfalfa appear. In the zone of the tosca, especially along the southern coast where the tosca is particularly well developed, conditions are poor for alfalfa and wheat invades the area where cattle are fed on grass pastures or on grain crops cut green for hay. 3. The third division of the Humid Pampa is the *Maize District* located in the vicinity of Rosario, a district where maize is more important than wheat. In both the Alfalfa-Wheat District and the Maize District two of the five forms of land use are combined, for here the commercial agriculture is superimposed on a pastoral base. 4. The fourth district is the *Intensive Truck, Dairy, and Fruit District* around Buenos Aires.

Only in that part of the Humid Pampa which we have previously described as the Northeast Pampa Rim have all the forms of land use occupied the same area in succession. The complete sequence is limited to the district around Buenos Aires. In the Maize District, to the west of Buenos Aires, four of the forms of use are, or were at one time, important—livestock ranching without agriculture, livestock ranching with alfalfa, commercial production of wheat, and now the commercial production of maize overlying the pastoral base. In this part of the Humid Pampa, more than in any other, the landscape contains relict forms from these earlier periods, now modified or in process of modification by the spread of the most recent system. The other parts of the Humid Pampa, especially the southeast, have a relatively simple history of settlement and land use.

1. The Pastoral District

In no part of the Humid Pampa at the present time is less than 40 per cent of the land devoted to pasture (Map 67). The widespread use of the land for pasture even in the most recent and the most intensively utilized agricultural districts reveals the continued economic and social importance of this traditional Argentine activity. All around the margins of the Humid Pampa, and extending into the neighboring regions to the west

Buenos Aires, largest city in the Southern Hemisphere, is the home of nearly a fourth of the people of Argentina. It covers more than eighty square miles; it has the longest avenue in the world — and the widest. The upper picture might pass as a view of any metropolis were it not for the balconies on almost every building — a characteristic of South American cities. (Courtesy of Moore-McCormack Lines.) In the lower picture just beyond the docks in the foreground we see the Casa Rosada, home of the President, and beyond it the Plaza

In the upper picture we get a closer view of the Avenida de Mayo in Buenos Aires. This is one of the famous baroque avenues of the world. At the lower left is a view of the Calle Florida, a shopping district known the world over. Here motor traffic is forbidden during the day and thousands of people come to walk or shop. At the lower right is seen the widest street in the world — the Avenida Nueve de Julio which only recently was cut diagonally across the older

ıd north, more than 80 per cent of the land is used for grazing. In the astoral District of the Humid Pampa, the land used for grazing also ıakes up more than 80 per cent of the area, and in some sections it inıudes more than 90 per cent. Alfalfa and wheat cannot be grown in the outheast except at a high cost because of the large amount of swampy .nd which would require drainage. The moist, cool summers, which :e not beneficial to such crops as maize, are, on the other hand, ideal for ..ie growth of pasture grasses. In the Pastoral District, therefore, livestock ranching without agriculture has survived as the predominant form of land use.

The grazing activities of this area, however, are not at all the same as those which once characterized the whole of the Humid Pampa. The Pastoral District is now a zone of concentration of high-grade mutton and wool sheep; it is a zone of increasing importance in the production of butter; and it has become the chief breeding ground for beef cattle. Because of the ticks the Northwest of Argentina has been unable to play the role of breeding ground for animals later to be fattened on the feed crops of the agricultural region. Northern Patagonia, which is free from ticks, might play this part. At present, however, the chief source of yearling steers is this Pastoral District of southeastern Buenos Aires Province. The existence within the Humid Pampa itself of good range lands in the southeast, unsuited to alfalfa and wheat, is, indeed, one of the most serious limitations on the rapid development of the pastoral possibilities of Northwestern Patagonia.

Because agriculture is so little developed in the Pastoral District this area has received few immigrant tenants. Few people are needed to care for herds of sheep or cattle, although the spread of dairying may lead to a demand for the services of more workers. At present, however, this district has the lowest density of rural population of any part of the Humid Pampa—a density ranging from ten to twenty-five people per square mile.

2. The Alfalfa-Wheat District

In most parts of the Humid Pampa the grazing activities have been accompanied by increased attention to the cultivation of crops. In a broad crescent, extending for six hundred miles along the western side of the Humid Pampa from Santa Fé in the north to Bahía Blanca in the south, the chief commercial crop is wheat (Map 71). Generally wheat is associated with livestock ranching and alfalfa. Included in this district,

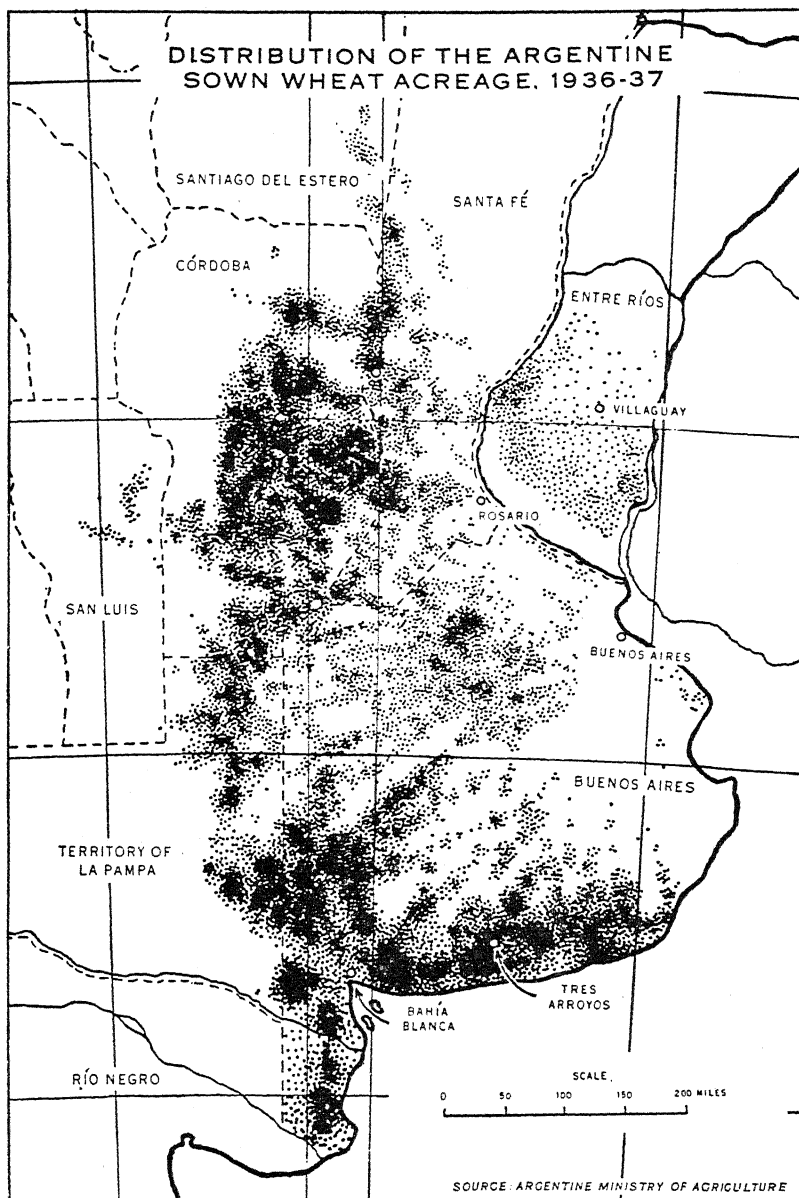
however, are the two transitional areas previously mentioned. Along the southern Pampa shore, east of Bahía Blanca, the animals are fed on native grasses or on rye and oats cut green for hay. Barley is also associated with wheat in this southern part of the Humid Pampa.

Of the several crops in the Humid Pampa not used for the feeding of animals, wheat, maize, barley, and flax are the four leaders. Wheat was the earliest of these; and the extension of wheat accompanied the increased demand for alfalfa. At the beginning of the First World War, wheat, maize, barley, and flax, grouped together, occupied a little over 30,000,000 acres. There was a slight decrease of acreage after the War, with a low of 26,000,000 acres in the depression year of 1921–22. Thereafter, the acreage of these four crops increased gradually to about 44,000,000 in 1930–31; and since then the combined total has remained steady.

The wheat acreage, on the contrary, has been unsteady. It reached more than 17,000,000 acres before the First World War, and, with fluctuations, climbed to a maximum, in 1928–29, of nearly 23,000,000 acres. Since 1930, when wheat prices fell because of the world-wide depression, wheat acreages have declined rapidly, dropping below pre-War averages in 1935–36 when there were only 14,000,000 acres planted. More recently, aided by droughts in North America, wheat prices and acreages have increased, and in 1938–39 the area devoted to wheat passed 20,000,000 acres; but with a large decline of prices in 1939–40, wheat acreage again showed a decrease.

This story of rapidly fluctuating acreages of wheat points to one of the fundamental peculiarities of the Argentine Humid Pampa. The fact is that the steady basis of the rural economy of the Alfalfa-Wheat District is still pastoral, with alfalfa as the leading feed crop. Wheat is grown by tenant laborers whose attachment to the estates is temporary and weak. A rise in wheat prices in relation to cattle prices results rather quickly in the settlement of more tenant families and an increase of wheat production; but a drop in price is also quickly reflected in decreasing acreages and in a decrease of tenant families in the wheat district. In recent years a notable increase in the use of agricultural machinery has been accompanied by marked decreases in the number of tenants.

Argentina faces no problem of stranded populations on the dry margin of wheat cultivation such as troubles the dry-farming region of the North American Great Plains. In the first place, the sharpness of the contrast between the ground-water conditions of the Humid Pampa and of the country to the west—as separated by the buried rock ridge south of the

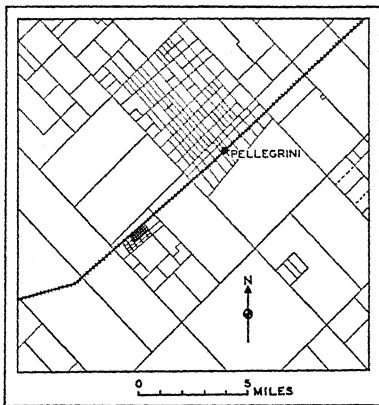
DISTRIBUTION OF THE ARGENTINE SOWN WHEAT ACREAGE. 1936-37
SANTIAGO DEL ESTERO
SANTA FÉ
CÓRDOBA
ENTRE RÍOS
VILLAGUAY
ROSARIO
SAN LUIS
BUENOS AIRES
BUENOS AIRES
TERRITORY OF LA PAMPA
TRES ARROYOS
BAHÍA BLANCA
RÍO NEGRO
SCALE
0 50 100 150 200 MILES
SOURCE: ARGENTINE MINISTRY OF AGRICULTURE

Map 71

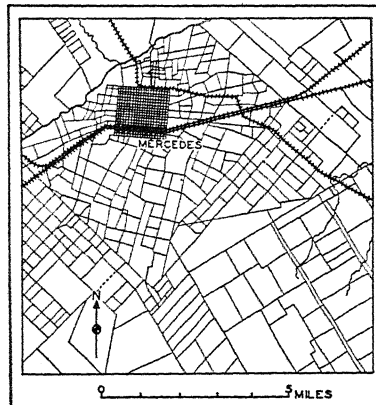
Sierra de Córdoba previously described—was brought into such prominence as a result of the spread of alfalfa that the western limit of first class grazing land soon became known to the landowners. In the second place, even where wheat cultivation had penetrated beyond this limit, a retreat was easily accomplished by the removal of the tenants and the return of the estates to pastoral uses. Thus looseness of attachment of people to the land was a distinct advantage in maintaining the economic flexibility of the area.

In the Humid Pampa the advantages due to economic flexibility must be discounted by the disadvantages inherent in social diversity. Under a system of production in which tenant farmers are loosely attached to large pastoral estates, rapid readjustment to changing agricultural prices is facilitated. For since the burden of debt mortgage and taxation is on the shoulders of the large landowners, recovery from periods of low agricultural prices takes place much more rapidly than where the financial burden is carried by many small owners. But in the Humid Pampa, even in times of high prices, the tenants could make only a very poor living, and none of the unearned increment went to enrich the people who were the active farmers. Only the fact that tenant incomes were better than the incomes to which the immigrants were accustomed in their homelands made the situation tolerable (115). The social diversity thus created between a wealthy landowning minority and a landless majority is one of the serious internal problems which the Argentines must face.

The Decrease in the Number of Large Estates. A number of forces are leading to a decrease in the number of large estates. The change is taking place slowly: there are still at least fifty families in Buenos Aires Province with holdings of more than 75,000 acres each. There is still a steady resistance to the temptation to turn the increased land valuation into money through actual sale. Much of this resistance is explained by the traditional attitude of the Argentine landowner toward money income. He does not invest surplus income as people do in North America or in parts of Europe; he spends it—for better living, for the construction of golf courses, polo fields, and swimming pools on the estate, or for a residence in Buenos Aires, or for travel and a European education for his children. He does not achieve prestige in society through the possession of money income, but rather through the ownership of land, the production of high-grade animals, and by the establishment of his family in a town house in the capital. Increasing land values, therefore, have not led to the sale or mortgaging of estates to the same extent as in North America. There are no colonies of retired farmers

expecting to live on income from investments. Nevertheless, there has been a trend toward the reduction in the size of the large holdings.

The movement to subdivide the large estates comes chiefly from three sources. In the first place, the inheritance law in Argentina, as in all countries whose legal system is based on Roman law, provides that all the children of a family must share equally in the estate left by the parents. An estancia of 100,000 acres inherited by four children is converted into four estancias of 25,000 acres each (138). In the second place, some of the landowners have been less successful than others in managing their estates; they have run into debt through extravagant living, and

MAP 72

Detail of pattern of properties near Pellegrini. See Map 60.

MAP 73

Detail of pattern of properties near Mercedes. See Map 60.

have been forced to sell their lands piece by piece. The map of landed properties in any part of the Humid Pampa shows the effects of this irregular arrangement of subdivided lands, for patches of small farm units are grouped among the prevailing large ones wherever sales have taken place (Maps 72 and 73). In the third place, an increase in the number of small properties results in a few areas from the sale of farms by private land companies.

Nevertheless, tenants still grow the larger part of the Argentine wheat crop. In 1932-33, of the farmers who harvested all the crops 65 per cent were tenants, and these accounted for 80 per cent of the agricultural production. Of the wheat crop alone, 75 per cent was harvested by tenants. The tenant farms in the Alfalfa-Wheat District ranged in size from 370 acres in the north to more than 1,000 acres in the south; there

is a distinct tendency toward increase of size with the increased use of machinery. About 25 per cent of the wheat crop is now raised on owner-operated mixed grain and livestock farms, on which the workers, being hired for wages, are somewhat more permanently attached to the land than in the case of the renters. Perhaps this last type of property is the one toward which the agricultural system is trending; but the trend will be slow because it must advance against the basic adverse attitude of the Argentine landlord toward agriculture as an occupation.

The Relation of Maize and Wheat

Wheat was the first grain crop to achieve a place for itself against the pastoral tradition of the Argentine Humid Pampa. It was grown first along the Northeast Pampa Rim, especially in the vicinity of Buenos Aires. Its great spread was coincident with the invasion of the country south of the Salado Slough after 1880. Wheat, also, first brought prosperity to the colonies of European immigrants established northwest of Santa Fé. In the course of time wheat was planted in almost all parts of the Humid Pampa and proved successful in all but the southeastern part.

The yield of wheat, however, has been found to vary considerably within the Humid Pampa (Map 68).[6] The best yields are in an area southwest of Rosario, where an average of from 17 to 20 bushels to the acre is reported. Yields between 13 and 17 bushels are to be had on the average through the central part of Buenos Aires Province and southward to the southern shore. Yields decline rapidly, however, to the southwest, dropping to between 6 and 9 bushels along the dry margin west of Bahía Blanca. At present most of the wheat comes from the zone yielding less than 17 bushels to the acre, and almost none from the area of highest yields.

The explanation of this exclusion of wheat from the area of highest yields is to be found in the competition of other grains. Since 1895, wheat has been challenged more and more successfully by maize, which, also, has its highest yields in the central district around Rosario. In this district an average of between 30 and 40 bushels to the acre is to be expected (Map 69). By 1912 there were approximately 9,500,000 acres of maize in Argentina, and most of it was in this central maize district newly developed out of the previous wheat area around Rosario. Maize holds its precedence over wheat in this zone because

[6] See the studies of agriculture in Argentina by P. O. Nyhus, published by the U. S. Dept. of Agriculture in *Foreign Agriculture*.

its yield amounts to nearly twice that of wheat (Map 70), and both crops bring about the same returns to the growers per bushel of grain. Beyond the limits of the Rosario district, there is a decline in the yield of maize indicating the relatively small area in which a favorable combination of fertile, well-drained soil, moderate temperatures, and dependable rainfall is found. Maize, especially, declines rapidly in its yield per acre as one moves into areas more frequently subject to drought. At Pergamino, in the center of the Rosario district, where the years of drought have been only three out of twenty-five, the average yields of maize are about 38 bushels to the acre. Ninety miles to the southwest, where the years of drought came ten times in a period of twenty-five years, the maize yields are only 17 bushels to the acre. This decrease is also partly due to the sandy nature of the soil and perhaps to other conditions of drainage or temperature. In the Maize District, where maize yields are twice those of wheat, maize occupies as much as 75 per cent of the land devoted to crops. Farther out toward the south and west, wheat soon equals maize and then exceeds it in acreage. In most of the area devoted chiefly to wheat the yield is nearly double that of maize, and in the territory west of Bahía Blanca it is more than double (Map 70).

Flax entered the agricultural scene on the Humid Pampa about 1900, and was extensively planted in the maize area. At first it was a favorite crop in the preparation of new land for other crops or for pasture. It, too, yields better in the Rosario district than elsewhere; but because of its greater resistance to heat and drought its yields do not drop off so fast as those of maize, especially to the north and east. In the Maize District, maize yields three times as much as flax per acre, but in Mesopotamia, north of the Paraná, it yields less than twice as much as flax. Entre Ríos, at present, is the chief flax-growing province of Argentina.

3. The Maize District

The third of the major agricultural divisions of the Humid Pampa, therefore, was developed after 1895 when maize had proved to be more profitable than wheat in the central district of high grain yields. Today the Maize District extends for approximately 145 miles east and west, and for 155 miles north and south, centering on the river port of Rosario. The area in which maize is predominant remained fairly steady from 1912 to 1928, but after 1928, when maize prices increased in relation to wheat prices, the Maize District began to expand. In 1935–36 more land was planted to maize than to wheat in the Humid Pampa. Since then maize

has dropped again in favor of wheat. The increases of maize acreage were made by extending the maize area westward, into territory where the yields per acre are less than in the Rosario district. The Maize District as a whole produces enough to place Argentina second only to the North American Corn Belt among the maize-growing regions of the world.

The Argentine Maize District, however, differs from all other similar regions of the world in its emphasis on maize as an export crop. Some 80 per cent of the Argentine crop is exported, and Argentina accounts for 75 per cent of the world trade in maize. Very little of the maize is fed locally to animals: although there is a small concentration of hogs in this district, Argentina is not an important hog-raising country, and there is no evidence of a trend toward the North American type of "corn-hog economy." About 90 per cent of the maize is the "flint" variety, characterized by small, hard, grains, low in water content—a type which is easily shipped and is in special favor for poultry feed in Europe. The "dent" varieties, used in North America chiefly to fatten hogs and cattle, are not popular in Argentina, and the local herds of domestic animals in the Maize District are fattened on alfalfa.

For the export of grain, this part of the Humid Pampa is especially well situated. The maize is loaded on railroads for a short haul to the port of Rosario, where, with a minimum of cost, it is transferred directly to ocean steamers. Rosario has become the world's leading city in the export of maize. Rarely in South America do we find so favorable a combination of things: soils, climate, navigable water, proximity to the metropolis—all combine to place this area among the world's most productive agricultural regions, now that it has been occupied by an agricultural people.

Landlords and Tenants. Even in the Maize District a sharp distinction still persists between the landowners whose interest is primarily in the grazing industries, and the tenants who raise the crops. About 66 per cent of the landed properties are large ones, still partly used for alfalfa pastures, and partly subdivided into tenant farms. Livestock and maize production still are two separate enterprises, involving the labor of two distinct groups of people. There are too few workers on the estancias to permit the cultivation of crops; and the tenure of the tenants is too insecure and their capital too small to permit their making a heavy investment in animals for fattening. Nevertheless there are more small farms and more large estates which have been devoted entirely to tenant farms under the supervision of a manager in the Maize District than elsewhere on the Humid Pampa.

Most of the crop is raised by tenants. Italian immigrants are settled on tracts of land of between 175 and 250 acres in size. In many instances the same tenant families have been planting maize with little rotation on the same pieces of land for more than twenty years; and frequently, also, one finds that these people have saved a considerable amount of money. Many of the more thrifty tenants have been able to buy small properties elsewhere, which they in turn rent to other tenants. The striking contrast in attitude toward money between these Italian tenants and the Argentine landlords is nowhere more clearly exhibited than in the use of money income. The desire to increase their wealth is to a much greater degree the dominant motive of the Italians than of the Argentines. Money saved is put to work to make more income while the family continues to live in what seems like a comfortless adobe house, built to provide shelter and with no consideration for permanence. There is no feeling for land ownership as such, no pride in property, no desire to remain on the land if, for any reason, it should fail to provide a substantial income. Unless this fundamental contrast in psychological attitude toward money and land is recognized there can be no real understanding of the relation of people to the land in the Pampa.

The Maize District is the part of the Humid Pampa which, except for the surroundings of the city of Buenos Aires, has the greatest density of rural people. The Maize District as a whole falls into the category of areas having between 60 and 125 people per square mile (Map 63). But this general figure gives, perhaps, a wrong impression. For on nearly half the area of the Maize District the densities are much less than this, and in the areas occupied by the Italian tenants, the rural densities are well above the average figure. Something of the irregular distribution of estancias and small farms, of dense population set in the midst of much less densely occupied land, can be seen on Maps 72 and 73.

4. The Intensive Truck, Dairy, and Fruit District

The Maize District is bordered on the east by a zone of intensive farming, devoted to supplying the market of the great metropolis of Buenos Aires. Small vegetable gardens even invade the outer fringes of the city. In this district around Buenos Aires there are two chief advantages for intensive farming: there is the easy access to the urban market, and there is the land which is ideally suited to the production of garden crops. The soil is fine grained, deep, and well drained; the rainfall is abundant and evenly distributed throughout the year; the winters are so mild that

there is no season when fresh vegetables cannot be provided. This is the land from which the Spanish settlers of the sixteenth century could derive only a meager living.

Not until the First World War, in fact, did the zone of intensive farming begin its important development. Before 1914 the people of Argentina had to depend on foreign supplies of dairy products. European canned milk and butter provided for the needs of the Buenos Aires market. Only when international trade was cut off during the War did the Argentines turn to the production of their own food supplies.

Dairying is now concentrated in the zone to the southeast of Buenos Aires, extending southward into the eastern part of the Humid Pampa. Because of the large proportion of swampy land in this section, and because of the cool summers and abundant rains, rich pastures of grass furnish good grazing for herds of high-grade dairy animals. Alfalfa and maize do not prosper. The population, therefore, is largely composed of pastoral specialists rather than farmers. Most of the land is divided into large estates, subdivided and rented to tenant dairymen.

Vegetables for the Buenos Aires market are produced close to the city. The small farms range in size from a few acres to twenty-five or thirty. The truck farms are clustered along the railroad lines, and on land within the urban limits not otherwise used. As the Argentine diet changes to include more and more fresh vegetables, the prosperity of this fringe of intensive truck farming increases.

Similarly the increase in the demand for fresh fruit among the people of Buenos Aires is reflected in a concentration of orchards located within easy range of the market. The delta of the Río Paraná provides a remarkably favorable site for fruit-growing. Along the floodplain of this river, the presence of the warm water from the north permits a long southward extension of tropical or subtropical kinds of plants. It has been found that such fruits as apples, pears, plums, peaches, and many others, yield excellently on the islands near the junction of the Paraná and the Uruguay. The suburb of Buenos Aires known as Tigre (Map 74) is not only a recreation center but also the nucleus of a new fruit-orchard district. Much of the land on the islands is owned by large fruit companies and worked by hired laborers. In addition to the orchards, there are plantations of willow and poplar which supply materials for the construction of the baskets and boxes in which the fruit is sent to market.

Within the relatively small area of this general district of intensive dairying, truck farming, and fruit raising, the density of the rural population is much higher than anywhere else on the Humid Pampa. In the

immediate vicinity of the city, densities mount to well over 125 persons per square mile.

BUENOS AIRES

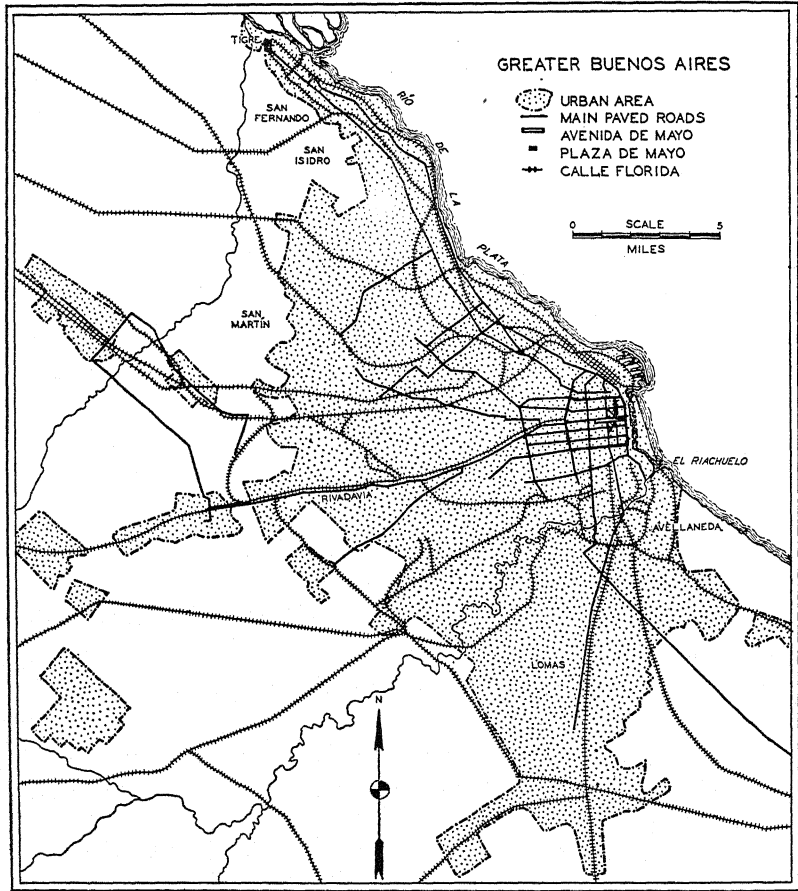
The city of Buenos Aires itself constitutes another division of the Humid Pampa, but one in which millions of people are concentrated, and on which the interests and activities of the whole Argentine state come to a focus. Greater Buenos Aires is a thoroughly cosmopolitan center. It is the product not of Argentina alone, but of the Occidental world; it constitutes an expression of that heroic age of economic expansion which led to the creation of metropolises in many parts of the world and to the flowering of urban society.

Like all the great cities of the Occidental world, Buenos Aires preserves in its patterns and forms the record of its long history. The marks still remain of the contrasted functions it has performed during its advance from a frontier post in a remote part of the Spanish colonial empire, to one of the world's great commercial and industrial metropolises. Most of the city growth, however, took place under the influence of the baroque period of urban architecture and planning—the period which produced such great urban avenues lined with buildings of uniform front as the Champs Elysées of Paris, the Avenida Rio Branco of Rio de Janeiro, the Paseo de la Reforma of Mexico City, or Commonwealth Avenue of Boston. The central avenue of Buenos Aires is the famous Avenida de Mayo. The so-called modern period of urban architecture is also finding expression in Buenos Aires, in the changed appearance of store fronts, and in the numerous skyscrapers which now diversify the skyline. Only by looking behind the façade can we find the elements which are more strictly local in origin, the elements which give distinctive personality to this great city.

The Founding and Growth of Buenos Aires

The place first selected for the establishment of a colony in 1536, and again in 1580 when the Spaniards came downstream from Asunción, possessed one important advantage. It was the only spot along this stretch of the Plata shore where the water was deep enough to permit boats to reach a dry landing place at the base of the barranca. Mostly, the southern shore of the Plata is low and marshy, with wide mud flats exposed when the wind blows from the south; but at one place the small tributary stream known as the *Riachuelo* provided an anchorage for the

shallow-draught boats of the sixteenth century close to the higher ground of the Pampa (Map 74). Otherwise this site had little to recommend it.

From 1580 to 1853 Buenos Aires was a place of very minor importance. Until 1778 oversea commerce was not permitted, for Spain wished to limit

MAP 74

trade with the colonies to the Panamá route. Buenos Aires, which did a small business in smuggled goods, had the main function of sealing this back door to the Spanish domain. After 1680, when the Portuguese established a fort on the opposite shore of the Plata at Colonia (Map 60), Buenos Aires played the part of a defense post, occupying a place of great importance in the struggle for the control of the Paraná-Plata. When the British attempted to occupy Buenos Aires in 1806 and 1807, the fact that

this little town held the key to the control of a wide and potentially rich hinterland was beginning to be understood.

The development of the agricultural possibilities of the Humid Pampa was accompanied by the spectacular growth of the urban nucleus on which all these developments focused. In 1778, when Buenos Aires was opened as a port, the population was only 24,203. In 1855, at the beginning of the modern period, the new Argentine capital had only 90,000 inhabitants. By 1870, however, it had increased to 270,000; by 1880, it had reached 433,000; and by 1890, it had reached 668,000. Buenos Aires passed the million mark in 1909, and at the time of the census of 1914, it had 1,500,000 people. Since the First World War the growth of the city has continued, reaching 2,197,000 in 1932. At present its population is estimated at about 3,000,000.[7] Associated with this rapid growth have come all those social and economic phenomena which are characteristic of modern Occidental cities: the rapid rise of land values in the center; the development of "blighted areas" in the old residence zone near the center, and in the suburbs; the rapid expansion of the city along the lines of travel, including the establishment of detached suburbs and satellite towns; and the over-rapid subdivision of land into small residence lots in the scramble for profits by land speculators.

The Urban Pattern

The urban pattern of Buenos Aires has developed around the original rectangular nucleus just north of the Riachuelo (Map 74). The center of the plan is the Plaza de Mayo, out of which the Avenida de Mayo extends westward as far as the capitol building. The main artery which continues to the west and southwest is the Avenida Rivadavia. As the city has been extended in this direction the various subdivisions one after another have been built along the Avenida Rivadavia, their right-angle streets conforming to the orientation of the central thoroughfare. The extensions of the city to the northeast have been attached similarly to the main avenue which leads through San Isidro and San Fernando to Tigre.

[7] Greater Buenos Aires, the geographical city, is made up of the following independent political cities with population in 1935 (Map 74):

City	Population
Buenos Aires (Distrito Federal)	2,195,200
Avellaneda	214,512
Lomas	40,000
San Martín	85,000
San Isidro	16,000
San Fernando	24,000
Total, Greater Buenos Aires	2,574,712

In the center of Buenos Aires, traffic congestion has led to the modification of the original rectangular plan. From the Plaza de Mayo diagonal avenues have been cut both to the northwest and to the southwest. The northern diagonal, the Avenida Saenz Pena, has become the axis of the commercial core. Buenos Aires also has built two systems of underground electric railways which converge on the Plaza de Mayo from the west and the northwest.

The various urban functions are concentrated in well-defined districts. The activities of the government are centered at either end of the Avenida de Mayo. The commercial core is located to the north of the Avenida de Mayo, differentiated into a district of tall office buildings, a banking district, a district of retail stores (along the Calle Florida), and others. The industrial district is located along the valley of the Riachuelo, and in the politically independent city of Avellaneda, just southeast of the Riachuelo. Most of the area of Greater Buenos Aires, however, is devoted to residence. Surrounding the crowded central district are miles and miles of low houses, monotonously uniform in character and arranged along right-angled streets. Only in the superior residence district, located along the Plata shore to the northwest of the center, does architectural and landscape variety make its appearance. The city includes also many square miles of suburban slums inadequately supplied with public utilities. A vigorous program of slum clearance and home construction, however, is now under way.

The port of Buenos Aires is an artificial one; it has been built to accommodate modern shipping at a place where no natural harbor existed—except for small ships. The city has had to spend many millions of dollars on the construction of basins and docks, and in constantly dredging the channel across the shallow Plata to deep water along the Uruguayan shore. The first port works, costly as they were, are now quite inadequate for the volume of shipping which comes to Buenos Aires; therefore a new port has been built north of the original one, and here much larger accommodations are now available. The crowded condition of the water front of Buenos Aires led to the development of the outlying port of La Plata.

ARGENTINA AS A POLITICAL UNIT

Buenos Aires, with a population of about 3,000,000, now includes nearly a quarter of all the people of Argentina. The long struggle for domination between the traditional centers of Argentine life along the

Andean piedmont of the Northwest and the upstart port has now come to an end with the complete leadership of the metropolis over the outlying parts of the country. This leadership of Buenos Aires extends to almost all fields, for, like Paris, or London, or New York, the Argentine capital draws to it a large proportion of the men of ability born elsewhere.

Yet one should not make the mistake of forgetting that Buenos Aires is not Argentina, any more than New York is the United States, or Paris, France. There are other parts of Argentina which have preserved a marked individuality. We may acknowledge the political, economic, and social leadership of the metropolis, without belittling the special contributions of the provinces, particularly of such places as Córdoba and Tucumán. Nor can one understand cosmopolitan Buenos Aires without a picture of the lands which lie over the horizon: of the varied pastoral and agricultural patterns of the Humid Pampa; of the hot, humid forests of the Chaco and the warm grasslands of Mesopotamia; of the sunny oases of the Andean piedmont; and of the wind-swept plateaus and cloud-shadowed mountains of the South.

Argentina and International Commerce

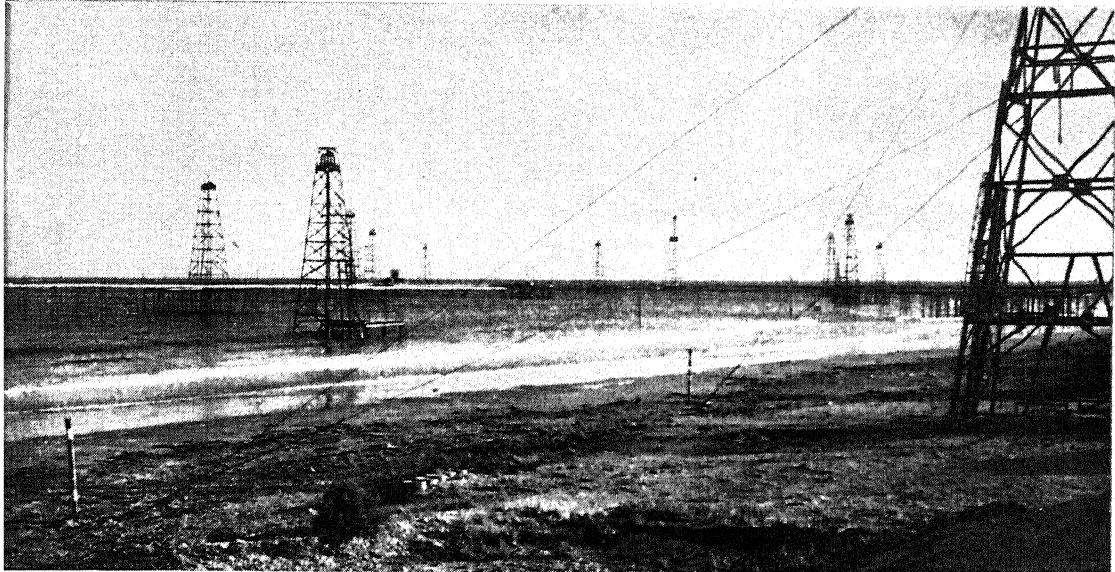
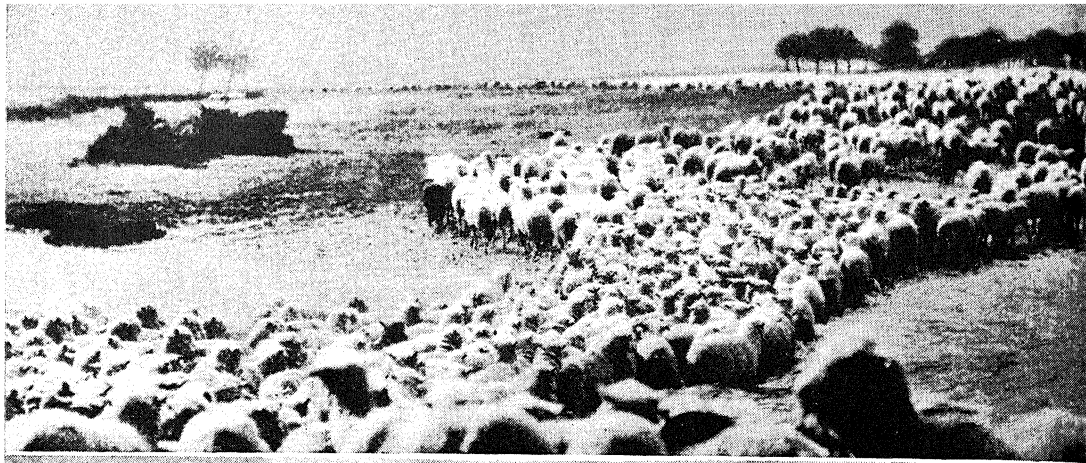
The inhabitants of the various parts of Argentina have long been accustomed to sell their products in foreign markets. In the colonial period, as we have seen, the mules and leather from the northern part of the Humid Pampa were sent through Tucumán and Salta to the prosperous mining communities of Peru. But little by little the outlying parts of Argentina have turned from these connections with neighboring countries and have come within the economic hinterland of Buenos Aires, either sending their products overseas through that city, or selling them to the increasing numbers of city people.

Argentina took its place among the chief commercial nations of the world during the latter part of the nineteenth century. The North American Civil War following soon after the fall of Rosas offered Argentina an unexpected opportunity to gain a foothold in the European markets, especially those of Great Britain. Argentina supplied meat and wheat; and in exchange, Great Britain supplied coal and manufactured articles of all kinds. British investments in railroads and packing plants, British purchases of Argentine foods, British sales of manufactured products in the expanding Argentine market, British coal shipments which formed the bulk cargoes to support the British steamship lines—these were the links which connected Argentina with Great Britain. The pros-

perity of the one was closely reflected in the prosperity of the other. Argentina could supply food at relatively low cost to the urban people of Great Britain, and the urban people of Great Britain were kept busy manufacturing the many things which the Argentines needed to buy. For the owners of capital and the owners of land, the system was a highly satisfactory one.

Even before the outbreak of the First World War, however, small but significant changes in these relationships were appearing in Argentina. In 1880, Argentina imported some two and a half million pounds of flour and produced almost none. But in 1913, newly constructed flour mills in Buenos Aires were producing two million pounds a year, and were being expanded. It was, however, the dislocations of 1914 that brought the first important challenge to the theory that such remote countries as Argentina should produce only raw materials and that the industrial centers of Europe and North America should supply the necessary manufactured articles to these places.

When Argentina was cut off from the usual sources of manufactured goods, she turned to the development of domestic manufacturing industries. Machinery was imported. Factories were built, and tariffs were set up to protect the infant enterprises. By 1920, shoes made from the local supplies of leather and cut for the Argentine trade could compete, for the ordinary market, with expensive imported shoes. Similarly, the woolen textiles made in Buenos Aires could meet the competition of all but the high-grade textiles from Great Britain. In almost every line of manufacturing, except machinery and steel and other items requiring highly skilled labor, the Argentine industries now dominate the local market, protected, like the market of the United States, by tariff barriers. Argentine factories now produce foodstuffs, textiles, paper, cement, glass, boots and shoes, furniture, rubber goods, beverages, and many other things in common use. The repetition of this same development in many parts of the world has had a serious effect on the function and prosperity of the urban centers of Europe and North America, and the character of international commerce has been very greatly changed.

The rise of large manufacturing industries in Argentina—chiefly in Buenos Aires, but also in Rosario, Córdoba, and Tucumán—has introduced a new element of diversity into the Argentine pattern of society. In the new order, prestige is gained by money income, by the ownership of capital. In the new strange life of the metropolis the ownership of land has little significance. A larger and larger proportion of the population, moreover, is in the class of industrial wage earners rather than of

At Comodoro Rivadavia (*above*), on the desert coast far to the south of Buenos Aires, settlers drilling for water struck oil. Production of oil has steadily increased until now Argentina produces the major part of her demand for petroleum. The port of Rosario on the Río Paraná (*below*) is the urban hub of the Maize District in Argentina. It ships more maize than any other port in the world. Ocean-going ships can ascend the river to this point. (Both photos, courtesy

Patagonia is a great sheep-growing region. In the picture above is seen part of a huge herd of 50,000 sheep being driven toward ranch headquarters for shearing somewhere in the territory of Chubut. During most of the year the sheep graze on the wetter lands near the base of the Andes. (Courtesy of the Ministerio de Relaciones Exteriores.) The lower photograph shows one of the large packing plants in Buenos Aires, from which frozen meat and meat products are exported,

rural tenants. In 1933, of the 5,018,000 people gainfully employed in Argentina, 43 per cent, or more than 2,000,000, were employed in industry. Only 22.6 per cent, or a little over 1,000,000, were engaged in agriculture and stock-raising. About 12 per cent were employed in commerce, and 3 per cent in the work of transportation. A new Argentina—an industrial Argentina—had made its appearance.

Argentine Exports. Argentina still remains the leading commercial nation of Latin America. Generally, Argentine commerce accounts for about half of all the commerce of South America. In 1938 Argentina shipped 98 per cent of all the wheat exported from Latin America; 80 per cent of all the meat; 50 per cent of all the hides and skins; 95 per cent of all the linseed; 95 per cent of all the maize; 59 per cent of all the cereals other than wheat and maize; 57 per cent of all the wood and wood products, including quebracho extract; and 52 per cent of all the wool. More than 90 per cent of all the Argentine exports come from the pastoral and agricultural activities—these two being nearly balanced.

Great Britain and the United States are the two chief markets for Argentine exports. Before the beginning of the Second World War, however, Argentina was selling to many of the other countries of Europe. The following table shows the distribution of this trade as it was developed in 1938, and modified by the beginning of the War in 1939:

EXPORTS OF ARGENTINA BY COUNTRIES OF DESTINATION*

Country	*Per cent in 1938*	*Per cent in 1939*
United Kingdom	32.8	32.9
United States	8.5	11.9
The Netherlands	7.4	7.3
Belgium	7.4	6.5
Germany	11.7	5.7
France	5.4	4.7
Brazil	7.0	4.2
Italy	2.5	2.1
Spain	0.5	1.9
Sweden	1.8	1.9
Others	15.0	20.9

Argentine Imports. The imports of Argentina include a wide variety of items, but fuels, machinery, and goods requiring highly skilled manufacturing processes are in the lead. In 1938, high-grade textiles made

*From the Pan American Union.

up 20 per cent of the imports; fuels, chiefly petroleum, made up 16 per cent; and machinery, including automobiles, made up 16 per cent. These imports were supplied from many countries, but the United Kingdom was foremost, with 18.3 per cent, the United States second with 17.7 per cent, and Germany third with 10.1 per cent. The increase of German imports during the 1930's was largely at the expense of imports from Great Britain.

Current Problems of Industrial Argentina

Foreign commerce remains essential to the economic life of Argentina. In fact the development of domestic industries and the increased concentration of people in cities increases this dependence. Foreign supplies of fuel and of machinery which must be paid for by exports tie Argentina more closely now to the other industrial nations of the world than Argentina was ever tied by raw material exports alone. It is a well-known fact that trade between two industrial countries is greater than between an industrial country and a country which produces only raw materials. But—it might be added—greater volumes of trade mean greater international interdependence, and hence vulnerability.

The world-wide depression came to Argentina in the form of decreased prices for the agricultural and pastoral exports. The total value of Argentine exports during the five years before 1928 was about $4,416,000,000; but during the five years which followed, the value of the exports dropped to only $1,805,000,000. A similar drop brought disaster to Chile: but in Argentina the results of the depression were not severe. Argentina was the last of the food-producing countries to attempt price control, and the first to feel the upswing of recovery.

Three chief reasons account for Argentina's rapid recovery from the depression (111). In the first place, the total volume of agricultural and pastoral production remained about the same. There were shifts in emphasis from one crop to another, as from wheat to maize; and there were migrations of settlers from one region to another, as from the Humid Pampa to the Chaco colonies; but taken as a whole, the agricultural production of the country remained quite steady in volume.

The second reason for Argentina's recovery was the demand for laborers on construction jobs. The era of railroad expansion was over, but there was great need for more office buildings, more factories, and more residences. The construction of the new port at Buenos Aires, the program of slum-clearance, and numerous other similar projects provided work for the increasing numbers of people who were coming to the big cities.

And the third reason for Argentina's recovery was the demand for more industrial workers in the new manufacturing plants. Argentina entered the depression at a relatively early stage of her industrial growth, with manufacturing plants not overbuilt with reference to the domestic market.

Meanwhile the rate of population increase in Argentina began to drop. This was due chiefly to government restrictions on further immigration. In 1935 only 17,340 immigrants arrived in Argentina, and of these only 602 were agricultural settlers. If immigration had continued unchecked, an unemployment problem of serious proportions might have appeared.

Domestic Industries and the Problem of Fuel and Power. The new domestic manufacturing industries which were absorbing many of the new urban dwellers during the 1930's are being developed in an unusual economic environment. In the older industrial centers of the world, especially those of Great Britain, manufacturing growth has been based on the existence of fuel and power and the import of raw materials. In Argentina there is an abundance of raw materials from the farm and the ranch, and perhaps even an adequate supply of some minerals, but there is a notable lack of power resources.

The chief fuels used in Argentina are coal, oil, and wood. Of the total fuel needs of the country, about half are satisfied with imported coal, about a sixth with oil, and another sixth with wood. Less than half the petroleum comes from national sources. Of the fuels consumed in Argentina, only 4 per cent are used for heating, while 25 per cent are consumed by industries and 50 per cent by the railroads. The United States, by way of comparison, uses 17 per cent of its fuel consumption for heating, 40 per cent for industries, and 25 per cent for the railroads (25).

Coal for Argentina has long been supplied from Great Britain. Coal from this source can be sold for relatively low prices in Argentina because it is of a high quality and so has a low shipping cost per unit of heat, and because of the low rates on the British ships which, as we have said, are partly supported by the exports of wheat. There are a few places in Argentina where thin seams of low-grade coal are to be found, but the high ash content and the mode of occurrence would make the use of these coals expensive. The national coal mines, which are located along the Andean piedmont between San Juan, Mendoza, and San Rafael, and farther south in Chubut, are too small to be shown on the accompanying maps.

Argentina does possess small quantities of petroleum. In 1907,

petroleum of fair quality was discovered at Comodoro Rivadavia in Chubut (Map 58), and production from that field has been increased until it now furnishes the major part of the Argentine supply. New fields have been brought into production in recent years along the Andean piedmont from Salta to Neuquén; the most promising of these fields is said to be near Mendoza. The oil industry is now a national monopoly.

The situation as regards water power is discouraging. At the Iguazú Falls, located on the northern border of the Argentine territory of Misiones, there is a potential horse power of some 325,000. But this is 800 miles from Buenos Aires, and no method of transmitting electric power so far has yet been devised. Water power is also abundant in the mountains of the south, where optimists envision the establishment of industrial towns and cities. At present, however, Argentina's water power developments amount to only about 35,000 horse power, and none of it is available for the industrial city of Buenos Aires.

Too Many People in the Cities? In spite of the handicap of lack of power resources, and in spite of the dangerous weakness of the domestic market itself, Argentine manufacturing industries were prosperous and successful. The fortunate timing of industrial expansion with the drop in prices of agricultural exports saved the country from the worst effects of the depression. But with such a large proportion of the population concentrated in cities, and with the continued decrease of rural population, Argentina's position became more and more vulnerable.

During the last few years Argentine writers have been suggesting that the country must enter a new phase of land settlement. The commercial exploitation of land is at an end, and now rural settlement is to be promoted for the social benefit of the people. The government is distinctly aroused over the problem of finding agricultural immigrants, and of finding agricultural land for them to occupy. Immigrants willing to become farmers and also possessing capital enough to buy farms are rare in these times; and public domain in Argentina exists only in the more remote and less attractive places. The great problem is to find land on the Humid Pampa which can be purchased by immigrants with little available capital on the basis of longtime payments. Only by increasing the number of small landowners can the stability of rural settlement in the Humid Pampa be assured. There is ample room, and the land is amply productive, to support a much greater number of people; but not with the traditional system of tenure.

Now the Second World War brings Argentina face to face with a new crisis. The scarcity of ships to carry the exports of grain and meat

11

REPÚBLICA ORIENTAL DEL URUGUAY

Total area, 72,153 square miles

Total population, 2,122,628

Capital city, Montevideo; population, 703,518

Trade per capita:

Imports: $20.35
Exports: $26.34

Unit of currency, peso ($.658, gold content value)

Major commercial products in order of value:

wool	linseed
beef	wheat
canned meats	sand and stone
hides and skins	

Railroad mileage, 1,486

(The above statistics are for the year 1938.)

11

URUGUAY

THE COURSE of human events in Uruguay since the arrival of the Europeans has been intimately connected with affairs outside the country and beyond the control of the Uruguayans. The position of Uruguay on the main channel of the Plata and midway between the centers of Spanish interest on the southern shore of the Plata and the centers of Portuguese interest to the north gives this little country a strategic importance out of all proportion to its size. Uruguay owes its independence to the rival claims of its two large neighbors, Argentina and Brazil, and to the interest of a great oversea power, Great Britain. Close integration with an expanding foreign market for its surplus products brought Uruguay great prosperity; but this left Uruguay, as it left Argentina, all the more vulnerable to disruptions of the international order. Uruguay, like Argentina, has been settled largely by newcomers from Europe; yet Uruguayan economic development has followed a different course from that of the country on the other side of the Plata.

THE URUGUAYAN PEOPLE

Uruguay, like Paraguay and Chile, is composed of only one area of concentrated settlement; but unlike either Paraguay or Chile, this one area includes the whole of the national territory. Uruguay is the smallest of the South American republics, and it has the distinction of being the only one in which the total national territory and the effective national

territory are identical (Map 1). The one cluster of people is centered about the one large city, Montevideo (Map 75). In a total population of a little over two million, about 720,000 live in the capital. No other city in Uruguay has passed fifty thousand: the industrial towns along the Río Uruguay—Paysandú and Salto—are just under fifty thousand, and the town of Fray Bentos is only a little over ten thousand. In the southern part of the country, along the Plata shore between Montevideo and Colonia, there are between 60 and 125 rural people per square mile; but toward the north the density drops rapidly to fewer than 25 people per square mile. In the northwest there are fewer than 10 per square mile (Map 77).

The composition of the Uruguayan population is similar to that of the people of Argentina. In and around Montevideo most of the inhabitants are of pure European descent. They came in large proportion from Italy and Spain, but many other European nationalities are represented by small numbers. In the outlying parts of the country there are enough people who have some Indian ancestors to give the mestizo class in the total population a proportion of something like 10 per cent. There are almost no pure Indians and almost no Negroes.

THE LAND

In many different ways Uruguay is a transitional land between the Humid Pampa and the hilly uplands and plateaus of Brazil. There is a southern fringe of alluvial land in Uruguay, bordering the lower Uruguay and the Plata north of Colonia (Map 75); but most of the country is hilly, with soils derived from the decomposition of the underlying crystalline rocks. In contrast to the monotonous stretches of tall grass which greeted the Spaniards when they first entered what is now Argentina, the Uruguayan landscape was composed of wooded valleys in which rushing streams of clear water could be found, and of long, gentle, grass-covered slopes rising to distant hills. Some of the more prominent ridges are crowned with gigantic granite blocks which form a strange contrast to the subdued contours of the rest of the country. Uruguay has been called "The Purple Land"[1] because of the faint purplish tinge given to the scene by the vistas of tall, prairie grasses on smooth hill slopes.

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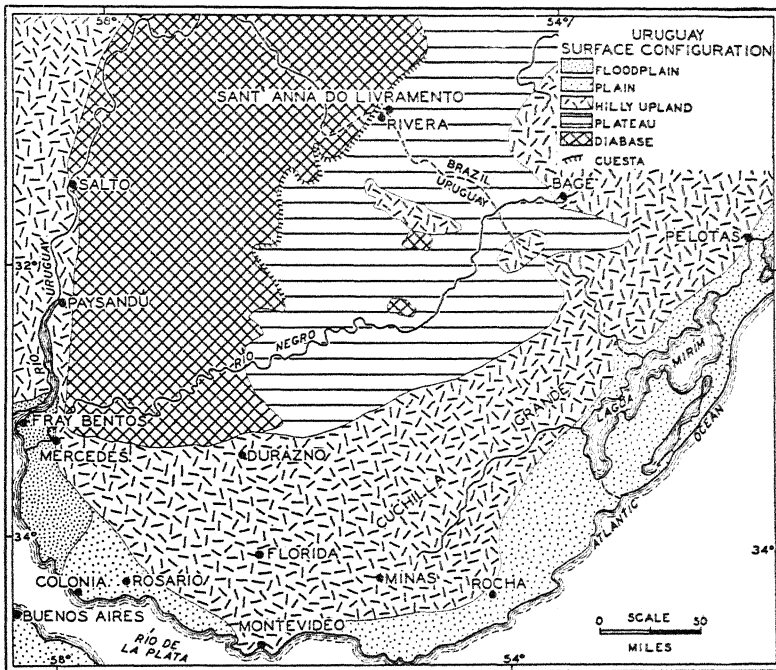
[1] See W. H. Hudson's description of Uruguay in the early nineteenth century in his book *The Purple Land.*

The Uruguayan geographers divide their country into several regions, basing their division on the character of the surface. Along the eastern coast there is a zone of lowland, composed of sandy beaches, lagoons, and wind-tossed dunes. Inland from this there is a belt of hills, running from the southern part of Brazil southwestward to the southern coast of Uruguay in the vicinity of Montevideo. This belt of hills is arranged along the divide between the shorter streams flowing directly to the

Map 75

Atlantic, and the longer streams which flow westward to join the Río Uruguay. The summits along the *Cuchilla Grande*, as the divide is called, reach elevations between 1,500 and 2,000 feet above sea level. Underlying the hills, and appearing at the surface in great weathered blocks along the crest, are the granites which form most of the soils of the eastern and southern part of the country. Westward from the Cuchilla Grande the land slopes gently toward the Río Uruguay: along the divide the valleys are narrow and the streams turbulent; but lower down, the valleys broaden out, and in a few places the streams have developed small floodplains. The Río Uruguay itself, however, is interrupted at several

points by falls and rapids, notably at Salto. The head of navigation for ocean steamers is at Paysandú.

In three parts of Uruguay the granites are covered with more recent formations. (1) Along the east coast, as we have said, the sandy shore deposits obscure the underlying rocks. (2) Along the Uruguay-Plata shore there is a fringe of level country where the crystallines are buried under typical Pampa deposits—river alluvium and loess. (3) In the central and northwestern part of the country there is an extensive cover of rock formations of later age than the granites. In the valley of the Río Negro these later formations are relatively weak and do not produce landscape features strikingly different from those of the crystalline area except for the absence of granite blocks along the hill crests. In the northwest, Uruguayan territory includes the southernmost portion of the Paraná Plateau. Flows of dark-colored lava now remain as flat-lying and very resistant formations bounded by a sharp cliff or cuesta. West and north of the cuesta the profiles of the hills are tabular rather than rounded, and the valley sides are angular rather than smoothly curved.

Vegetation and Climate

Vegetation and climate are also transitional between the Argentine Humid Pampa and southern Brazil. Most of Uruguay was originally covered with a tall-grass prairie (Map 7). The stream valleys, however, were and still are, followed by ribbons of dense forest; and along the lower Río Negro where it joins the Uruguay near Fray Bentos and Mercedes the forest extends over a considerable area. In the southeast, around Rocha, the grasslands are mixed with scattered palms. In other words, although the predominant vegetation type in Uruguay is the tall-grass prairie—similar to the pasto duro of the Pampa—there is also a considerable mixture of forest, especially along the valley bottoms.

The climatic conditions, too, are of a transitional character. The climate of Uruguay, perhaps more than that of any other part of the middle latitudes, can be described as "temperate." Throughout the country, the average temperatures of the coldest month are not far from 50°—similar to the winter averages in Georgia and South Carolina. The summers, however, are cooler than in the corresponding part of North America: at Montevideo the average of the warmest month is 72°, approximately the same as the average of the warmest month in Boston, and a little lower than that of Buenos Aires. The rainfall is evenly distributed throughout the year, with no regular season of excessive rain or of drought.

On the average the rainfall varies from about 38 inches at Montevideo to nearly 50 inches in the north. Although there is a considerable irregularity in the total fall from year to year, periods of prolonged drought are rare. This irregularity, however, might have a more serious effect on such crops as maize than it has on the pasture grasses.[2]

SETTLEMENT

Enthusiasts have described Uruguay—with its freedom from climatic extremes, its prevailing gentle slopes, and its abundance of clear water and nourishing grasses—as the world's finest grazing land. Yet Uruguay offered the enthusiasts the opportunity to observe this happy combination of elements only after the Plata region had been occupied by Europeans for more than two hundred and fifty years. The physical qualities which make Uruguay such a fine grazing land could not operate to bring prosperity to the inhabitants until the large international markets had developed in Europe and North America, and until the local people were ready to undertake the production of surpluses for export.

During the colonial period, Uruguay was remote both from the centers of Portuguese settlement and from the centers of Spanish settlement. Remoteness in the case of the Portuguese was chiefly the result of the great distance between Uruguay and the primary settlement center at São Paulo. Yet by 1680, the Portuguese had pushed southward all the way to the Plata shore and had established a fortress at Colonia, opposite Buenos Aires (Map 5). Remoteness from the Spanish settlements on the Humid Pampa was primarily the result of the river barrier. The Paraná-Plata is so wide, and is bordered by such a labyrinth of swamps and shifting channels that to cross it, or even to use it as a line of travel, has always been difficult. The Spaniards were interested in their connections through Tucumán and Salta with Peru; for the trade in mules even the grassy Pampas on the southern shore of the Plata west of Buenos Aires were considered too remote to be valuable as breeding and grazing grounds. The *Banda Oriental*, or eastern shore, as the Uruguayan margin of the Plata was called, was even more isolated with respect to the routes to Peru.

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[2] From 1901 to 1924 Montevideo's annual rainfall ranged between a maximum of 94 inches in 1914 and a minimum of 21.6 inches in 1907. During those 23 years, eight years received less than 30 inches. From H. H. Clayton, *World Weather Records*, Smithsonian Miscellaneous Collections, Vol. 79, Washington, D. C., 1927.

The Beginnings of Settlement

For nearly two hundred years after the Spaniards first reached the Plata region, they made no fixed settlements in what is now Uruguay. The Banda Oriental was occupied chiefly by nomadic cattle herders, or gauchos. Cattle were introduced about 1603, and were permitted to run wild and to multiply. Gangs of gauchos followed the herds, rounding up a few animals here and there for slaughter. Only the hides were of value unless the animals were killed near the shore, where the carcasses might be used in the making of tallow or as salt beef. There was no attempt to claim ownership of the land, no attempt even to establish ranch headquarters. The bands of gauchos fought as readily for Portugal as for Spain, and when no profitable fighting was to be had, they would battle among themselves.

The idea of land ownership came slowly to Uruguay. The first Uruguayan contacts with the commercial world were with the Argentine cattle buyers who crossed the river from Buenos Aires to deal with the gauchos. In the course of time these buyers found it easier to establish fixed headquarters and to employ herders to keep the cattle near by than to follow the half-wild herds over the vast interior of the country. At first, only the ranch headquarters were definitely established, and the boundaries with neighboring ranches were left undefined; but as more and more of the land was occupied, boundaries became important. As the zone of ranches, or estancias, moved northward from the Plata shore, the nomadic gauchos were pushed to the more distant parts of the country. The landowners replaced the gauchos with hired workers and peons —men who were attached to the estates by some form of debt bondage. Even then the interior of Uruguay remained a land of men, for unmarried males rather than men with families were preferred as workers.

The Towns of Uruguay

As this type of rural settlement we have just described spread northward across Uruguay, small villages and towns began to appear. Generally these settlements were located at road junctions, and since the easiest lines of travel followed the water partings, or cuchillas, and avoided the wooded valleys, most of the small villages were established on the ridge-tops. At the smaller road junctions perhaps only one or two retail stores would appear, surrounded by a cluster of dwellings; but at the larger junctions, small towns with a considerable population of merchants

would be established.[3] Uruguay became a land of small scattered trading villages, and of widely spaced ranches.

Montevideo was not founded until 1726. Portuguese advances finally forced the Spaniards to build a permanent fortress on the Uruguayan shore. They selected an excellent site where the hilly belt of the Cuchilla Grande reaches the southern shore, providing a small sheltered harbor dominated by a low conical hill on which the fortress could be built. Almost at once Montevideo became the chief urban center of the Banda Oriental, and most of the roads of the interior were redirected to lead to this new port. There was not then, and there never has been since, any competitor to challenge the supremacy of Montevideo as chief center of the economic, political, and social life of the country.

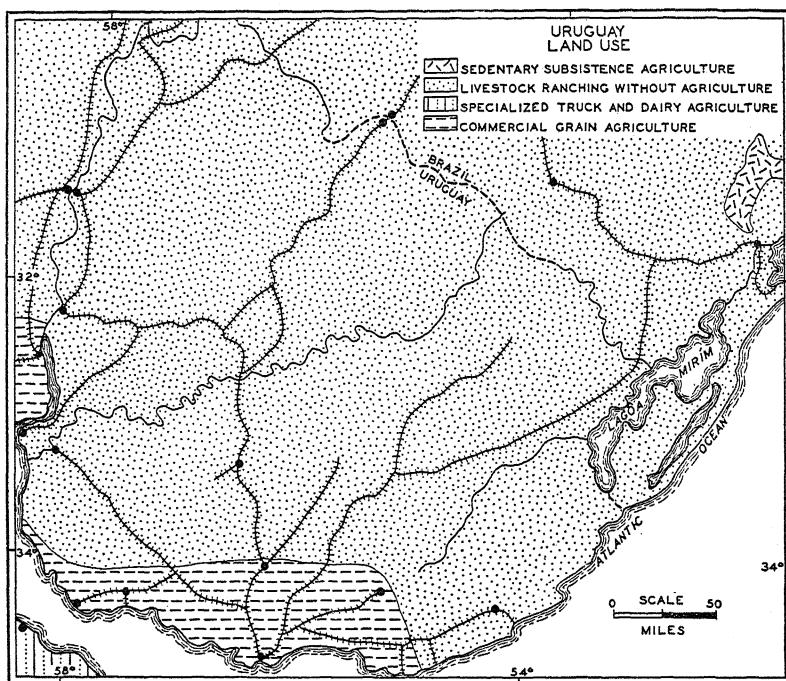
Uruguay as a Buffer State

National independence came to Uruguay as a result of influences beyond its borders. For centuries the conflict between the Spaniards and the Portuguese continued without decisive action. When Brazil declared its independence in 1822, Uruguay was included as a part of Brazilian national territory. In 1825 an Argentine army invaded the Banda Oriental and pushed the Brazilians northward, gaining control of the whole of what is now Uruguay. Meanwhile, the British had already appreciated the potential economic value of the Humid Pampa, and the consequent strategic importance of the places which command the approaches to the Pampa. If Great Britain had not been involved in European difficulties when in 1806 and 1807 she made an attempt to capture Buenos Aires, the whole Plata region might have become a British dominion. In spite of defeat at Buenos Aires, British interest in the region continued. When it looked as if Argentina might be in a position to control both sides of the Plata, the British intervened, and in the subsequent peace negotiations they were able to secure the agreement of both Argentina and Brazil to the establishment of an independent Uruguay as a buffer state. Uruguay began its independent existence in 1828.

Uruguayan Railroads

The Uruguayan railroads, like those of Argentina, were built chiefly by the British, made use of British rolling stock, and burned British coal.

[3] E. S. Giuffra (144, pp. 492–497) suggests a variety of ways in which these towns actually came into existence: towns first established around temporary army bases; towns built around chapels; towns founded by decree; and other similar modes of origin.

The first line was built out of Montevideo in 1868, and has since been extended northward to connect at Rivera with the Brazilian railroads (Map 76). Lines also have been built to reach the towns of Fray Bentos, Paysandú, and Salto along the Río Uruguay and Pelotas in Brazil. Uruguay today is unique among the republics of South America in that all of its railroads are built on one uniform gauge (4 ft., 8½ in.).

MAP 76

Immigrants and Rural Properties

The pattern of rural properties and the forms of land use were developed on the framework of the roads, railroads, and commercial centers. By the beginning of the nineteenth century most of the territory was divided up into huge estancias. Around the outskirts of the towns, especially around Montevideo, there were small *chacras* devoted to the production of wheat, maize, vegetables, and cheese for the local market. These were the only agricultural lands; for most of the estancias were used for the grazing of cattle, and later for the grazing of sheep.

Uruguay resembles Argentina in that the native-born Uruguayans remained pastoralists while the people who occupied the first agricultural

units and who have now developed the agricultural zone along the southern coast (Map 76) were recruited from among the immigrants. Uruguayan immigration, however, has been much smaller than that of Argentina. One of the most important periods of population increase in Uruguay came after independence had been established (1828), and at a time when General Rosas was making conditions in Argentina unattractive for foreigners. A considerable number of Italians and Spaniards settled in Uruguay, establishing themselves either in the cities and towns, or in the agricultural zone along the southern shore. In 1842, Montevideo was a city of 31,000 people, of whom 66 per cent were foreign born. After the fall of Rosas, however, the main current of immigration shifted to Buenos Aires, and since then Argentina has received the greater proportion of newcomers to the Plata region.

Two reasons seem to be chiefly responsible for the rapid development of commercial agriculture in Argentina and the greater persistence of the pastoral life in Uruguay. First is the fact that alfalfa provides better pasture than grass in most parts of the Humid Pampa, and the Argentine landlords called for more and more tenant farmers to prepare the land for this crop, while the landlords of Uruguay, where grass is better than alfalfa, did not need so many farm tenants. And second, the yields per acre of all the important crops, especially wheat, maize, and flax, are highest in the area of dependable rainfall around Rosario, and the somewhat lower yields per acre in Uruguay reduced the margin of profit for the Uruguayans so much that this land could scarcely compete in the commercial production of grain with the superlative farm districts of Argentina. Since 1895 there has been in Uruguay no tendency toward an increase of the acreage devoted to crops or toward an increase in the number of farmers.

Meanwhile the total population of the country has been increasing steadily, partly by excess of births over deaths and partly by immigration. Although the numbers involved in the Uruguayan increase are much smaller than the numbers involved in Argentine increase, the proportions are not very different. In 1883 there were some 520,000 people in Uruguay; by 1908 the total population had reached 1,000,000; at present it is estimated that the number of Uruguayans is about 2,225,000.[4] Much of the increase has been absorbed in the growth of the cities, especially of the capital, Montevideo.

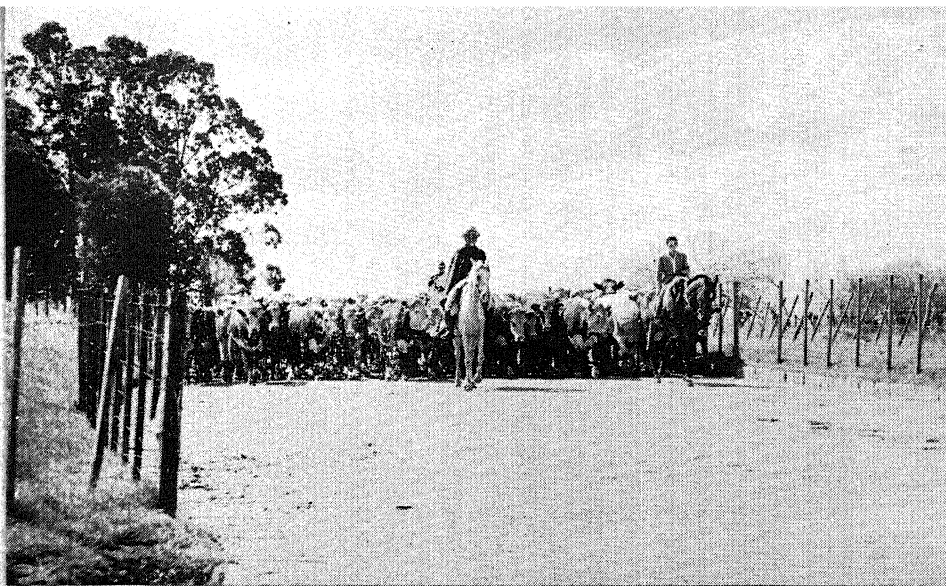
[4] Between 1869 and 1895 the Argentine population increased from 1,737,000 to 3,955,000; and in 1914 it reached 7,885,000. (Data are from A. E. Bunge, 110.)

The Pastoral Life

Meanwhile, the pastoral economy has not remained unchanged, any more than in Argentina. Great readjustments have been made in Uruguayan life between the days when creole cattle wandered on the unfenced range, providing hides, tallow, and salt beef, and the present time when high-grade Durham and Hereford cattle are fed on fenced pastures. Uruguay is now second only to Argentina in meat exports, sending out in 1939, 10 per cent of the meat exports of Latin America. Meat-packing plants or *frigoríficos* have been established, such as the big Liebig plant at Fray Bentos. At first, the high-grade animals demanded by the packers were to be found only in the vicinity of these plants, but in the years between 1906 and the end of the First World War the change from creole cattle to European breeds went forward rapidly—today few creole animals remain in Uruguay. The chief purchaser for the new meat supply was, and still is, Great Britain.

Wool, too, entered the Uruguayan export trade, and is now established as the largest single item of commerce. High-grade wool and mutton sheep were introduced into Uruguay about 1840; especially in the latter part of the nineteenth and the early twentieth centuries the big profits to be made from wool led the estate owners to specialize more and more on breeds of sheep that would give the finest quality. As a result, herds of high-grade merino sheep have become a characteristic feature of the Uruguayan rural scene. In 1938, wool made up 43 per cent of the value of all Uruguayan exports; and although the value of the wool shipments suffered a disastrous drop in 1939, in the latter year Uruguay accounted for 37 per cent of all the wool exports of Latin America.

The changes in the landscape of rural Uruguay which accompanied the shift from scrub animals to carefully bred animals were in many respects different from the changes which accompanied a similar shift in Argentina. Better pastoral techniques required the services of a greater number of workers, but not of any such numbers as were needed on the Humid Pampa to plant alfalfa. In both regions careful breeding required fenced pastures—and these could not have been provided in a land of few trees before the invention of barbed wire. In grasslands where well-defined roads scarcely existed before the use of fences began, the fencing of fields and properties for the first time confined travel to definite rights of way. Again, the result in Uruguay was different from that in Argentina, for Uruguay has never had the difficult problem of road building which was faced in the Humid Pampa, with its lack of gravel.

Uruguay, though the smallest of the South American Republics, boasts in Montevideo one of the finest cities in South America. This capital city is a favorite summer resort not only for Uruguayans but also for Argentines — who can reach it by an overnight boat trip from Buenos Aires. The picture above shows Pocitos Beach, one of the most popular bathing places. The lower picture is of the Plaza Independencia in the center of Montevideo. The statue is of General José Artigas, hero of the wars of inde-

The predominance of pastoral life in the interior of Uruguay is revealed by the public driveways built for cattle and sheep, such as the one shown above. The man on the right, riding a fine horse, is the owner of a large estate, and takes pride in the quality of his stock. Uruguay's chief export is wool. Below is a scene in one of the big wool depots of Montevideo where the clip is being sorted and bagged for shipment to European and North American markets. (Both photos, courtesy of Moore-McCormack Lines.)

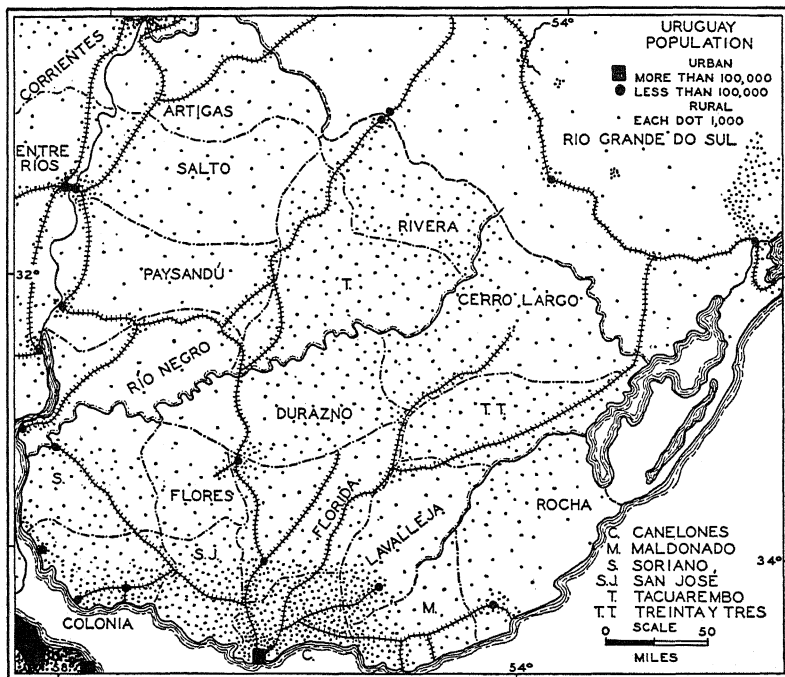
In Uruguay the preoccupation of the rural people with stock-raising is reflected in a peculiarity of the roads: a wide driveway for herds of sheep and cattle is commonly included in the public right of way, carefully fenced off from the bordering properties, and from the part of the highway reserved for horses and wheeled vehicles.

Agriculture

While the pastoral life and pastoral products dominate the economic scene in Uruguay, there is nevertheless an important agricultural zone, and a rather stable agricultural population has established itself there (Map 76). Although only a small part of Uruguay is physically unsuited to the production of crops, the fact that the country was settled by a pastoral-minded people, combined with the fact that nearby Argentina offered better opportunities for commercial farming, has resulted in only a very small proportion of the country being planted to crops. The proportion has varied from less than 4 per cent (1919–20, and 1922–23) to more than 6 per cent (1927–28, and 1929–32). A similar proportion was planted in crops in 1895. The agricultural zone is sharply defined, as might be expected where there has been so little expansion of the area devoted to crops. This zone is clearly reflected in the distribution of people (Map 77). Within the agricultural zone the properties are much smaller than they are in the pastoral region, and the habitations are scattered, rather than grouped together.

The population of this well-defined agricultural zone has remained fairly stable for many decades. During the First World War the number of farmers rose to 116,000 (1917–18), but since that time the number has fallen to less than 100,000. While it is true that the proportion of the total population engaged in agriculture has dropped since 1912 from 7 per cent to 4 per cent, this change in ratio is due chiefly to the increase in urban population rather than to any great decrease in the number of farmers. The proportion of the agricultural people who own their own farms is higher than in Argentina—46 per cent in 1932. Apparently the Uruguayan agricultural zone has a relatively stabilized population. Yet there is no sign of an expansion of the agricultural area, nor is there reason to suppose that Uruguay is on the threshold of a great change in the relations of its agricultural and pastoral peoples.

In the agricultural zone four chief crops are to be found, only one of which enters regularly into foreign markets. Wheat is the most important in terms of acreage, covering well over half of the land devoted to

crops. Generally the Uruguayan production of wheat is about equal to the needs of the country. Flax, the second crop in acreage, is the only agricultural product which is regularly exported. In 1938, linseed made up 5.3 per cent of the Uruguayan exports. The two other crops of the

Map 77

agricultural zone are oats and barley, which are generally used to supplement pasture grasses in the fattening of cattle.

Montevideo

The chief functions of the city of Montevideo are those of government and commerce. Neither Montevideo nor any of the other smaller towns has had any important industrial development such as that which helped to extricate Argentina from the worst effects of the world depression. The only large industries are for the packing or processing of animal products, some of which industries are located in Montevideo and others on the Río Uruguay at Fray Bentos and Paysandú. In the commercial life of Uruguay, Montevideo has no rivals: in 1934 the capital handled 96 per cent of the imports and 82 per cent of the exports of the country.

Montevideo has two other functions in addition to its major role as capital and chief commercial center. It is the port to which the fishing fleet of the South Atlantic is attached, and to which the fleet returns in winter to repair and resupply the ships. It is also a resort city of considerable popularity, largely patronized by Argentines, and easily reached from Buenos Aires by an overnight boat trip or by airplane. The hotels and casinos of Montevideo are famous, and, since they are owned by the government, they bring in a substantial income to the Uruguayan treasury—when the Argentines have money to spend.

THE LAST DECADE IN URUGUAY

Perhaps no country in South America has been more dependent for its own prosperity on conditions beyond its borders than the little country of Uruguay. This is one of the characteristics of a buffer state. But this dependence is more than a matter of the conflicting interests of Brazil and Argentina: Uruguay is also dependent to a marked degree on foreign markets for its products. When the currents of international trade flowed freely, Uruguay became wealthy; and because this wealth was shared by a relatively small population, the per capita trade of Uruguay was for a long time the highest in South America. Before the world-wide depression the Uruguayan peso was worth more than the United States dollar. The country was prosperous in a moderate way; and its numerous experiments in the field of government ownership, public insurance, pensions, minimum wages, and so on, placed it in the forefront of nations attempting to solve the perplexing social problems of the age.

The depression, however, changed this picture very greatly. The incomes of the rural people declined about 40 per cent, owing to the drop in the prices of pastoral products on the world markets. Meanwhile the prices of industrial products remained steady. As a result the Uruguayan economy was disrupted, and unemployment reached menacing proportions. When, in 1938, the United States almost ceased importing wool, and the proportion of Uruguay's export trade which went to the United States dropped from 14 per cent to 4 per cent, the difference was only partly compensated by increased purchases by Great Britain, and by barter arrangements with Germany. Real recovery in Uruguay must await a general rise of prices for wool and meat on the world markets. Perhaps if the world returns in time to a more orderly way of life, Uruguay may once more regain the prosperity which close contact with the international markets once gave it.

PART II

PORTUGUESE SOUTH AMERICA

12

ESTADOS UNIDOS DO BRASIL

Total area, 3,286,170 square miles

Total population, 45,002,176

Capital city, Rio de Janeiro; population, 1,896,998

Trade per capita:

Imports: $6.71
Exports: $6.72

Unit of currency, milreis ($.06, gold content value)

Major commercial products in order of value:

coffee	oilseeds
cotton	carnauba wax
cacao	tobacco
hides and skins	maté
meats	rubber
fruits	

Railroad mileage, 20,945 (1937)

(The above statistics except when noted are for the year 1938.)

12

BRAZIL: INTRODUCTION

NEARLY HALF of the continent of South America belongs to the United States of Brazil. With 3,286,170 square miles of area, Brazil is surpassed in continuous territory only by the Soviet Union, China, and the Dominion of Canada. Brazil's area is greater than that of the forty-eight states of the United States of America, and about the same size as Europe without the Scandinavian Peninsula and Finland. Yet this vast area is occupied by only 45,000,000 people[1]—about one third of the population of the United States of America and about the same as the population of Italy. Brazilians make up more than half of the people of South America, to be sure, but their numbers are not enough to occupy effectively more than a small part of their national territory.

Brazil seems to offer great possibilities for pioneer settlement and for population increase. The Brazilians estimate that under present conditions and methods of agriculture and stock raising about 80 per cent of their land is potentially productive; the geographer Friedrich Freise (151), in a recent study, raises this estimate to 90 per cent, excluding, as unproductive, slopes which are very steep, areas which are too swampy or too dry, soils which are too sterile, and places which have been rendered unproductive through destructive methods of use. Brazil pos-

[1] Preliminary returns from the census of 1940 indicate that this estimate is much too high. Apparently the population of Brazil numbers only a little over 40,000,000.

sesses, moreover, an important supply of mineral resources, including the world's largest and purest deposit of iron ore.

Why, then, after four hundred years of settlement, is so large a part of Brazil still outside the areas of concentrated population (Map 1)? Why, in short, are there so few people in Brazil? Is Brazil on the threshold of a great pioneer movement, similar to the westward movement of the North American frontier during the period between 1870 and 1914? These questions do not have simple answers. As we have found in other examples previously discussed, problems of habitability involve also the objectives, attitudes, and technical abilities of the people, and world economic conditions. No answer, moreover, can be given for the whole of Brazil without reference to the diversity of its parts. The theory is frequently advanced that Brazil's difficulties are primarily due to the fact that most of the country lies within the tropics. This, however, is oversimplification, for within the tropics there are many varieties of climate, and some of the most densely populated parts of the earth—Java and India, for example—are in lands with rainy tropical climates. To formulate more clearly some of the problems and conditions of Brazilian settlement we shall first consider this vast territory and its people in some of the broader aspects; later we shall proceed to a detailed discussion of the various parts of the country.

THE LAND

The Brazilian land, as a matter of fact, does contain a number of superlative advantages for an Occidental commercial people. No other large political division of the earth has anything like the proportion of potentially productive area that Brazil possesses. Within this territory of continental size, moreover, there are many kinds of minerals and many species of plants which have brought in the past, or could be expected to bring in the future, large financial returns by sale in foreign markets. But a study of Brazil uncovers example after example of the poor geographical arrangement of these superlative qualities. The absence of coal which can be made into coke at low cost is a serious handicap in a land so rich in iron ore. The lack of any large natural focus of the routes of travel, as guided by the pattern of valleys and lowlands, scatters and isolates the clusters of people. And those relatively small parts of the Brazilian territory which mountainous slopes or uncertain rainfall render unproductive are situated on the very borders of the areas of dense settlement, that is, where the limiting effect on expansion is most keenly felt.

Surface Features

Only a very little of Brazil's vast territory can be described as a plain (Map 6). Along the western border of the country, in the south, Brazil does include a portion, but a very small portion, of the lowlands of the upper Paraguay. The largest area of plain, however, is in the upper Amazon Basin, where level lands stretch eastward into Brazil from the

Map 78

base of the Andes in Bolivia, Peru, Ecuador, and Colombia. The Amazon lowland, unlike most river lowlands, becomes narrower downstream: in the eastern part of the Basin only a ribbon of floodplain carries the river through the highlands. The Atlantic coast, especially in those areas which are densely populated, is bordered by only small, discontinuous bits of lowland; there is no real coastal plain like that of eastern North America.

The greater part of the Brazilian territory is made up of highlands. The Brazilian Highlands, south of the Amazon, and the Guiana Highlands north of it, are both constructed of a basement of geologically

ancient crystalline rocks, covered, in part, by stratified sandstones and limestones, and by sheets of diabase. Where the crystallines are exposed at the surface, the rapid decomposition of such rocks as granite and gneiss has resulted in a deep mantle of fine-grained soil, and in the formation of gently rounded hills. The stratified sandstones and the diabase, on the other hand, are so much more resistant to the processes of denudation in the rainy tropics than the granites that they stand distinctly above the general level of the crystallines, and the margins of the sandstone or diabase cover are marked by steep cliffs. The elevation of these two highlands varies from only a few hundred feet to a little over three thousand feet above the sea.

In only a few places do mountain ranges rise above the general highland surface. These occur especially in Southeastern Brazil, where there are several such ranges, composed also of crystalline rocks, but of types which are more resistant to erosion than the granites and gneisses. These stand above the crystalline hilly uplands with rounded outlines, strongly reminiscent of the outlines of the Great Smoky Mountains of the Southern Appalachians in North America. The highest elevation in Brazil, the Pico da Bandeira, a little northeast of Rio de Janeiro, is only 9,462 feet above sea level. In the Guiana Highlands, Mount Roraima, which is really not a mountain but a plateau held up by an unusually resistant portion of the sandstone cover, is almost as high as the Pico da Bandeira, reaching 8,635 feet above the sea.

The Brazilian Highlands, for the most part, drop off sharply toward the Atlantic. In the northeastern part of the country, north of the city of Salvador in Baía[2] (Map 80), there is a gradual rise from coast to interior; but from Salvador southward to Porto Alegre in Rio Grande do Sul, the coast is backed by a steep, wall-like slope—the Great Escarpment—which, from the ocean, so much resembles a range of mountains that one part of it is called the Serra do Mar. Back of Rio de Janeiro and Santos, the Great Escarpment rises to an elevation of 2,600 feet, and in certain places in this part of Brazil it is surmounted by ranges which reach elevations between seven and eight thousand feet above sea level. Between latitudes 18° S. and 30° S. the Great Escarpment is crossed by only two deeply cut river valleys—those of the Rio Doce and the Rio Paraíba; otherwise it remains scarcely notched along its crest. In only two places—between Santos and São Paulo, and between Paranaguá and Curitiba—is this escarpment concentrated in one sea-facing slope.

[2] In this book the new official simplified spelling for Brazilian place names has been followed throughout.

Along most of its course it is broken into a series of steps, forming parallel escarpments with deep valleys between (Maps 86, 91, and 98).

The rivers which drain the Brazilian Highlands all descend over the steep margins in falls and rapids. Most of these rivers have their sources in the central and southeastern part of the highlands—some on the very crest of the Great Escarpment. For instance, the Paraná system to the west of the highlands is fed by several tributaries in São Paulo State which rise within sight of the Atlantic Ocean, flow northwestward into the interior, and join the Paraná along the western border of São Paulo State. The rivers of Southern Brazil also flow westward toward the Paraná. The Paraná itself drops over the resistant diabase formations near the northeastern border of Paraguay, forming the Guayra Falls (known in Brazil as the *Cachoeira de Sete Quedas*); from these falls downstream as far as Posadas in Argentina the Paraná passes through a narrow canyon cut in the plateau. The whole southern part of the Brazilian Highland, therefore, is drained through this circuitous channel southward to the Plata.

Similar features are exhibited by the rivers which drain northward. The São Francisco rises in the southeast and flows parallel to the coast for more than a thousand miles before it turns eastward in the northern part of Baía and descends in the Paulo Affonso Falls to the Atlantic. The great tributaries of the Amazon, the Tocantins-Araguaia, the Xingú, and the Tapajóz, all rise in the central area, flow northward, and descend over falls and rapids as they approach the Amazon. Only the Amazon itself is navigable far into the interior. Even the Madeira is interrupted by hundreds of miles of rapids where it crosses the westernmost edge of the Brazilian Highlands.

From the point of view of human settlement, only a very small part of the highlands is too steep for either agricultural or pastoral use. But the fact that the rivers drain inland away from the southeast coast means that there is no natural focus of routes on this part of the country. That the lines of travel today actually do come to a focus on such large cities as Rio de Janeiro or São Paulo has been brought about in spite of the lack of any large natural convergence of routes on these places.

The Climates

In that large portion of the continent of South America which belongs to Brazil there are many varieties of climate. In no part of Brazil are to be found those conditions of temperature and humidity which Hunting-

ton and others have shown to have a favorable effect on human energy.[3] Brazilian climates contain few extremes, either of temperature or of moisture; yet they are by no means so monotonously uniform, or so unbearably hot and damp, that the human spirit is deadened. If the Brazilian people in certain regions appear to be lacking in energy, this cannot be interpreted as the inevitable result of the climate until such other elements as diet and disease have been evaluated.

A considerable amount of misinformation exists regarding the temperatures of tropical countries like Brazil. The world's highest temperatures are not found near the equator, but in the deserts more than 30° of latitude from it. Average annual temperatures increase as one approaches the heat equator—which, in South America, passes along the Caribbean and Guiana coasts through such places as Maracaibo and Georgetown. The ranges of temperature between coldest and warmest months, however, decrease as one comes closer to the heat equator. In the equatorial regions temperatures are moderately high throughout the year, but they never are so high in those regions as they are in summer in the lower middle latitudes. In South America the places where the highest extreme temperatures have been recorded are found along the Caribbean Coast, and, during the southern summer, in the Argentine Chaco (Map 8). At Santarém, on the Amazon and only a few degrees from the equator, the highest temperature ever recorded is 96.3°, and the lowest 65.3°. At this same place the average annual temperature is 78.1°. In the dry region in Northeast Brazil, the highest temperature recorded by any station is 106.7°; but as one proceeds southward along the coast where the rainfall and cloudiness are greater than in the Northeast, the maximum temperatures are much lower. At Rio de Janeiro the average temperature of the warmest month is 79.0°—about the same as the average of the warmest month at Raleigh, North Carolina. The average of the coldest month at Rio de Janeiro is 68.7°—which is similar to that of the coldest month at Miami, Florida. In the highlands of Brazil, temperatures are lower than at the same latitudes on the coast; in the highlands of Southern Brazil temperatures are similar to those of the Southern Appalachians. The northern limit of frosts is found in the northern part of the state of Paraná and the southern part of São Paulo.

Human comfort, however, is not a matter of temperature alone, but of humidity and wind as well. Relative humidity, especially along the Brazilian coast, is considerably higher than at the places mentioned in southeastern North America. At Raleigh the average relative humidity

[3] Ellsworth Huntington, *Civilization and Climate*, New York, 1924.

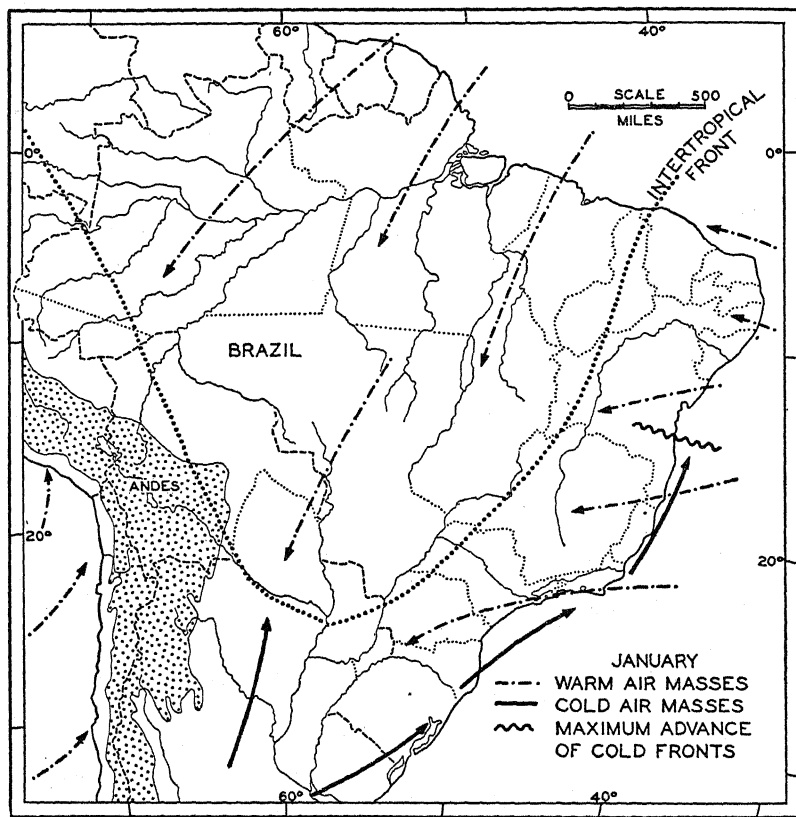
is 60 per cent, whereas at Rio de Janeiro it is 78 per cent. In places exposed to the open sweep of the wind, the high humidity may be compensated, but in protected places, or in places where the winds are not steady, the humidity may become uncomfortable. It is because of the irregularity of the winds at Rio de Janeiro that so many Europeans and North Americans who live there complain of the heat during the summer months.

The rainfall is another climatic element which is neither excessive nor deficient in more than a few small parts of the Brazilian territory (Map 9). More than 80 inches a year are received in four sections of the country—in the upper Amazon lowlands, along the coast north of Belém, in scattered spots along the Great Escarpment and on the mountain summits of the Southeast, and in a small area in the western part of the state of Paraná. On the slopes of the Serra do Mar between Santos and São Paulo there is a belt of very heavy rainfall, concentrated in a narrow band along the Escarpment, which has contributed to the formation of one of the better water-power sites of the whole continent.

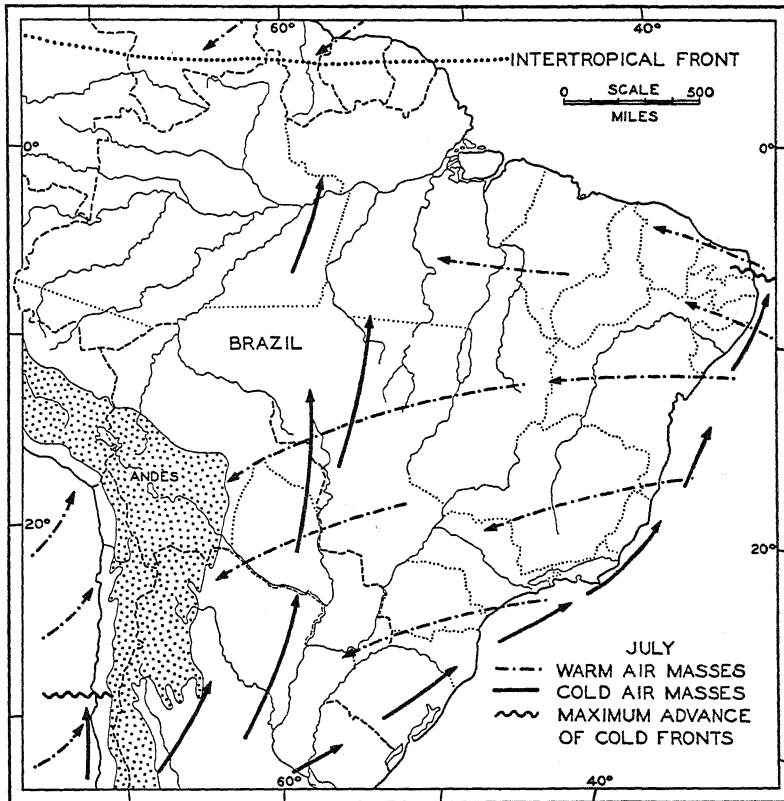
Moisture deficiency is limited to a small part of the Northeast. There are spots in this region which receive less than 10 inches a year; but most of the area receives between 20 and 25 inches. The problem of the Northeast is one of rainfall irregularity—variations between excessive rains and droughts. In certain parts of this region floods or droughts were recorded more than fifty times between 1835 and 1935. As settlement begins to penetrate to the Brazilian interior, areas of climatic risk not known at present may be discovered.

In most parts of Brazil the rain is heaviest in the summer, and a winter dry season is a regular occurrence. The southern states, however, from the southern part of São Paulo State southward, have no real dry season, but only a season of somewhat less rain in winter. In the Amazon Basin the rains come mostly from January to June; the other half of the year is less rainy.

Brazilian weather is produced by the interaction of moving air masses of different origins (Maps 79a and 79b). Along the east coast from Cape São Roque southward two kinds of air are involved: first, the warm air masses which originate as part of the whirl of air around the South Atlantic high-pressure center and move along the coast from northeast to southwest, bringing predominantly clear skies or high stratus clouds; and second, the cold air masses of polar origin which, having crossed Argentina from the southwest, continue northeastward along the Brazilian coast. The impact of the two kinds of air masses produces towering

cumulus clouds and heavy rains. In January this alternation of relatively cool southwest winds and relatively warm northeast winds continues along the coast as far as about latitude 20° S.; in July, however, the cool air masses penetrate northward even as far as Cape São Roque, bringing regular frontal rains as they advance.

Map 79a

The interior of Brazil is also a scene of conflict between air masses of different origin. From January to May, the season of maximum rain, most of the interior is under the dominance of warm, moist air from the northeast—air of equatorial North Atlantic origin. This is not a "trade wind" in the older sense of that term; it is a monsoonlike indraft which blows onto the continent during the southern summer, but which has no winter offshore counterpart because the land is not far enough from the equator to become cold. As another result of the equatorial position

of this current of air from the northeast, there is little or no deflective force from the earth's rotation; this permits the warm, moist air to move far into the interior of the continent, reaching the eastern slopes of the Andes and the northern part of Paraguay. This is the season of maximum rain in the interior.

MAP 79b

In July, on the other hand, the warm air circulating about the South Atlantic high-pressure center reaches the Brazilian coast south of Cape São Roque and enters the interior, penetrating even to the eastern slopes of the Andes (Map 79b). This air is relatively dry, and while air masses of tropical Atlantic origin are present in any locality the weather is clear. The cold air masses of polar origin are more vigorous at this period of the year also, and not only penetrate farther toward the equator along the coast, but also move northward through the Paraguay Valley, bringing

cool, showery weather even as far as the Amazon. In the equatorial parts of Brazil the cool spells, or *friagems*, of the southern winter season are anything but comfortable.

The dry region of the Northeast is on the margin between the more or less regular rains along the coast south of Cape São Roque and the more or less regular rains west of São Luiz de Maranhão. The eastern edge of the monsoonlike indraft from the equatorial North Atlantic extends farther and farther eastward as the rainy season—January to May—progresses. Each year it moves east of São Luiz; some years it moves eastward all the way to Cape São Roque, and the result is heavy rains and floods; in other years it fails to move much beyond São Luiz, and the result is drought. No way to predict these irregularities has yet been discovered.[4]

Natural Vegetation

The various conditions of climate together with those of the underlying surfaces and soils are expressed in the cover of natural vegetation (Map 7). The heavy rainfall of the Amazon Basin and of the coast south of Salvador is reflected in the tropical rain forest, or selva. The Amazon Region contains the world's largest area of such forest. The selva is composed of evergreen, broadleaf trees, some of great size mixed with others of lesser size. In places where the selva has been carefully studied, as many as three thousand different species of trees per square mile have been identified. The branches are interlaced overhead in such a dense canopy of foliage that not much light can reach the forest floor, and as a result these forests contain little underbrush except along the banks of rivers, or in places where, for some reason or other, the foliage has been thinned. The soils under such forests, where they are not covered at frequent intervals by newly deposited material, are generally very poor in plant foods and in humus, for the heavy rains percolating through the upper layers of the soil dissolve the soluble minerals, and the vigorous bacterial action under conditions of high temperature and humidity quickly destroys any organic matter that falls to the ground.

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[4] The various types of climate according to the Köppen system are presented on Map 10. Perhaps the chief advantage of this climatic classification is that it permits a comparison of the climates of different parts of the world, and makes possible the location of the climates in such a specific area as Brazil in the general world pattern of climate. These comparisons and patterns, as well as the basic meteorological principles underlying the movement and interaction of air masses are presented in the references previously cited in footnote 6, page 172.

In places which are not quite so rainy and not quite so warm as those which are covered with selva, the forest which appears is described as semideciduous. It is composed of smaller trees, some of which lose their leaves during the dry season. Because light can more easily penetrate to the ground, the semideciduous forests have more underbrush and may actually be more difficult to traverse than the selva. Forests of this kind occupy the coast of the Northeast, south of Cape São Roque; south of Salvador the semideciduous forest covers the eastern margin of the highlands as far as southern São Paulo State, and extends even farther southward along the valley of the Paraná.

The greater part of the interior of Brazil, however, is covered with a mixture of dry savanna and scrub forest. The distinction between these is not in every place clear, for the savanna is covered with scattered scrub trees, and the scrub forest includes not only a grass-covered floor, but also many savannalike openings. To identify the boundary along which trees become so numerous that the formation merits classification as a forest rather than as a savanna is difficult. The scrub forest is found usually in the drier places, as in the interior of the Northeast; most of western Brazil, south of the Amazon forests, is savanna. In all these areas of scrub forest and savanna the stream courses are followed by ribbons of evergreen or semideciduous galeria forests.

In the southern part of São Paulo State two types of vegetation appear which belong to the middle latitudes rather than to the tropics. These are the Araucaria forests and the prairies. The Araucaria forest is composed of a mixture of pine and broadleaf species; it is sharply set off from the tropical semideciduous forest by the northern limit of frosts. At about the same latitude, also, the savannas with their scattered scrub trees give way to pure tall-grass prairies, with dense forests in the deeper river valleys—a vegetation type characteristic of Uruguay.

These various categories of natural vegetation offer a clue to the relative potential value of the various parts of Brazil for different kinds of agricultural and pastoral uses. The tall-grass prairies, for instance, are better grazing lands for cattle than the tropical savannas, even for animals bred to withstand the insects which abound in the savannas. The best agricultural land for rice is offered by the floodplain of the Amazon, although the utilization of this resource would require the presence of an Oriental rather than an Occidental people. Outside of the alluvial areas, however, the regions of tropical rain forest are relatively poor lands, having little sustained fertility in their impoverished soils. From an agricultural point of view the savannas and scrub forests are also relatively poor.

For shallow-rooted crops the semideciduous forest regions having soils which are richer in soluble minerals and in humus than those under the selva constitute Brazil's best agricultural areas; in these areas, both in general and in detail, the chief centers of sugar and coffee production have been established. The tropical crops which are limited by the recurrence of frosts are excluded from the regions of the Araucaria forest.

The map of the natural vegetation (Map 7), therefore, suggests that a very large part of the Brazilian interior is relatively low-grade country from an agricultural or pastoral point of view. Whatever effort in terms of money or labor is put into the work of making it productive would yield much higher returns if applied to the still unoccupied portions covered, or formerly covered, with the semideciduous forests. These interior lands are not unproductive, for they could furnish a living for subsistence cultivators or stock raisers, and there are certain areas where conditions are suited to certain kinds of crops—for example, the valley of the São Francisco where the soils are excellent for cotton. Nevertheless, it seems apparent that Brazil is much more narrowly limited in its supply of first-class agricultural land than is generally thought.

Mineral Resources

When the French geologist Gorceix in a poetic moment exclaimed that Brazil's state of Minas Gerais had a "breast of iron and a heart of gold," he neglected to point out that there was in that state a deficiency of fuels which could be used to produce the high temperatures necessary for smelting. The gold and diamonds of this region did form the basis of the prosperity of Brazil during the eighteenth century—in fact, during that period Brazil produced 44 per cent of all the gold of the world. But the iron and manganese, and the many other industrial metals apparently available in this part of Brazil, have yet to be developed on a large scale. Manganese has been mined; iron smelting with the aid of charcoal has been carried on for many years, and an excellent quality of steel is produced. But the problem of maintaining the supply of charcoal becomes more acute every year as, little by little, the forests are stripped away. Brazil's coal, located in Santa Catarina and Rio Grande do Sul, contains such a high proportion of ash and sulphur that it must be processed before it can be used as a fuel. Nevertheless, the deposits of iron and manganese, and perhaps other metals, such as copper, lead, zinc, nickel, and chromium, will probably before long be exploited on a larger scale. The chief zone of minerals is the prominent range of mountains running roughly north and south through central Minas Gerais (Maps 6 and 78).

THE PEOPLE

None of the many advantages and disadvantages inherent in the physical make-up of Brazil have real significance for us in terms of human settlement until we know about the people and their way of living. Perhaps nowhere on the earth is there a greater mixture of different kinds of people than in Brazil. The primary ingredients are Portuguese, Indian, and Negro, but during the past century the population has been much altered by the arrival of millions of immigrants from Europe and Asia. All these elements have mixed freely, for one of the important traits brought by the Portuguese was the absence of any taboo against race mixture, except among the aristocracy. Each ingredient, therefore, has given certain easily observable physical characteristics to the new race of Brazilians, and has contributed numerous culture traits to the Brazilian civilization.

Early Racial Ingredients

The Indians who inhabited Brazil in 1500 were chiefly of Tupi-Guarani stock—a linguistic group to which the Indians of Paraguay also belong (Map 4). In almost every respect these Indians of eastern South America were a contrast to the Quechuas of the Andes. The Tupi-Guarani tribes were hunters, fishers, collectors, and shifting cultivators. They lived in small, scattered groups with no form of intertribal political organization. Their basic food crop was manioc rather than maize. It is estimated that the Indian population of 1500 in all of Brazil was only about 800,000.

As a source of labor, the Tupi-Guarani proved quite inadequate. In the first place, great numbers of them died of European diseases in the early years of the conquest. Those who survived were handicapped by the traditional Indian attitude toward work. Agriculture was left to the women; the men devoted themselves to hunting, fishing, and fighting. The men could not adjust themselves to the agricultural work demanded by the Europeans. Free intermarriage, however, between the Portuguese men and the Indian women introduced many of the physical and psychological traits of the Indians into the resulting population.

Negroes, also, made an important contribution to the composition and character of the Brazilian people. Beginning in 1538, Negro slaves from Africa were brought across the ocean, especially to the Brazilian Northeast, where there was a demand for field hands in the new sugar industry. The Negro was not only a good worker, but he also possessed

a knowledge of technological processes which has often been overlooked. The Negroes of the Sudan, it should be remembered, were the inventors of the process of iron smelting. This technological ability they brought with them to Brazil, along with their rhythmic music and their superstitions. The Negro foremen on the plantations, or later in the gold mines, knew more about the technological processes than did many of the Portuguese owners. From the seventeenth to the nineteenth century, agricultural and mining enterprise in Brazil owed a large debt to the Negro laborers and technicians.

From the Portuguese, however, came the main characteristics of the Brazilians. Even before their departure from Europe, the Portuguese were already made up of a most remarkable variety of racial and cultural elements, inherited from the various peoples who had successively conquered the Iberian Peninsula. Like the Spaniards, they included ingredients of Celtic, Nordic, and Mediterranean origin; and especially in the south of Portugal, around Lisbon, there was a large mixture of Moorish blood and of Moorish and Semitic culture traits. Moreover, the Portuguese from Lisbon were familiar with the use of Negro labor, for slaves had been brought to this part of Portugal in considerable numbers during the period of Moorish rule. Like the Spaniards, too, the Portuguese had the traditions of feudalism and of large private estates—traditions which profoundly influenced the relations of people to the land throughout Latin America.

The Portuguese had long been accustomed to commerce and to adventuring in distant places when they came to America in search of quick wealth. Like most of the Europeans who came to the New World—including the English—the foremost objective was to loot the rich resources of a virgin land. The Portuguese were much less interested than the Spaniards in implanting their institutions in America; they had little of the fanatical zeal for the spread of Christianity that their Spanish brothers possessed. They were attracted less by the prospects of earning a living by persistent toil than by the opportunities for speculative profit. As one Brazilian writer puts it, the ideal was "to collect the fruit without planting the tree" (147, p. 21). Whereas some of the peoples of America have been led by force of circumstances to be content with less spectacular returns from more intensive forms of economy, the Brazilians, with their huge land area, their superlative resources, and their small numbers, are still seeking new ways for the speculative exploitation of the treasures stored up in nature. This is the Brazilian variation of the theme of El Dorado.

Course of Settlement

History and geography have both contributed to the settlement of Brazil and to the development of the present patterns of population. In the history of settlement in the four hundred years since the Portuguese first planted successful colonies on the coast of South America, three products, in turn, have dominated a period. Each period has been characterized by the spectacular rise of a commercial product, by the sale of this product in an expanding market and the collection of promoter's profits, and by the eventual decline of prosperity owing to increasing competition from areas of production outside Brazil, where people were willing to invest in "the planting of the trees." Each of Brazil's great products has led to the development of one specific region, and has given rise to an area of concentrated settlement around an urban nucleus. As one product after another has passed its zenith and begun its decline, the population has moved on to new frontiers, or remained decadent. The chief products which have thus punctuated Brazilian history and have colored the Brazilian map are sugar, gold, and coffee. In addition there have been minor interludes neatly set off in time and space—dominated by rubber, cacao, oranges, and other products.

The early decades of the colonization of Brazil by the Portuguese, however, were not associated with any of these commercial developments. The first settlement was established in 1502 at Salvador in the state of Baía. But the Portuguese found no sources of gold and gems comparable to those of India, and no rich native civilizations which invited pillage. Brazil was neglected, because at the beginning of the sixteenth century Portugal was a poor country with a population which probably did not number more than a million; and for many decades she had all she could handle in the development of her connections with India and the other parts of the East. Brazil was neglected until the encroachments of the French and the Spaniards made it imperative for Portugal to establish colonies on the American coast, or to relinquish her claims. The division of the coast of Brazil into *capitanias*, each under the direction of a person selected by the Portuguese crown, led to a very uneven distribution of settlements, for those capitanias which came under the direction of capable organizers and administrators flourished, while others which came under the direction of men of lesser ability were often not settled at all. A successful colony was founded at São Vicente, near the site of Santos, in 1532, and another at Olinda, near the site of Recife in the state of Pernambuco, in 1537; Recife itself was not

founded until 1561. Meanwhile a mission was established on the site of the present city of São Paulo in 1554—the first of the Brazilian settlements on the highlands.

The three chief primary settlement centers from which the Portuguese carried forward their conquest of Brazil were São Paulo, Salvador, and Recife (Map 5). These are the places which correspond to Mexico City, Cartagena, Lima, and Asunción in Spanish America. Rio de Janeiro, founded on its present site in 1567, was at first only a fortress and naval base for the protection of the coast, and not at all a primary settlement center.

Sugar Colonies

The rapid rise of the commercial production of sugar in Brazil took place late in the sixteenth century. Sugar cane was introduced in 1532 and planted around São Vicente; but not until the second half of the sixteenth century did the spectacular rise of this new product begin and then it was the Northeast, centering upon Salvador, which prospered. A considerable difference appeared early between the colonists who came to São Vicente and São Paulo, and those who came to Salvador and Recife. According to Freyre (166) the Portuguese who settled in the Northeast included a considerable proportion of wealthy people, many of whom came from the north of Portugal and had long been accustomed to the direction of large estates. The people who settled at São Vicente and São Paulo were mainly from the south of Portugal—mostly poorer people who did not possess enough capital to go to the aristocratic colonies of Baía and Pernambuco. The Northeast was also much closer to Europe and to Africa than was São Vicente. Distance in the days of small sailing vessels was of greater significance in human affairs than it is today. At any rate, it was the people of the Northeast who were able to buy Negro slaves, to build sugar refineries, to clear the land, and to plant sugar cane; the people of São Vicente, with their Indian slaves, were unable to share in any important way in the prosperity of the sugar period. The plantation owners of the Northeast soon found themselves selling on a rapidly expanding market, and producing at costs which, after the initial investment, were very low. During most of the seventeenth century, the Northeast of Brazil was the world's chief source of the new and increasingly popular food product, sugar from cane.

So profitable did the sugar-producing area of the Northeast become that it invited conquest by other European powers. In 1624 the city of

Salvador was occupied by the Dutch. Although they were soon forced to withdraw from Salvador, the Dutch succeeded in occupying Recife and in spreading their control of the Brazilian coast all the way from the northern border of Baía to the Amazon. The Portuguese colonists, however, returned to the attack and, without help from Portugal, pushed the invaders back step by step until, in 1654, they recaptured the city of Recife. This was a very important event for Brazil. The co-operative effort necessary to retake Salvador and Recife built certain loyalties and traditions which explain in part the present solidarity of the Northeast as a region.

Gold

While sugar production was bringing wealth to the people of the Northeast, especially in the states of Baía, Pernambuco, and Paraíba, the settlers in the south were enjoying no such prosperity. The people of São Paulo were poor; they had discovered no source of wealth within their means to exploit; yet they were not at all content to accept this situation. From São Paulo a series of semimilitary expeditions went forth into the interior of the country. These expeditions were called *bandeiras* and the members of the expeditions were called *bandeirantes.* The first objective was to find gold—which had already been discovered in many of the stream gravels of the country south of São Paulo. But gold in the South proved to exist only in small quantities, and the bandeirantes had to seek other forms of wealth to exploit. They found Indians; large numbers of the native peoples, having first been brought together around the mission stations, were carried into slavery. Intermarriage with the Indian women became common, and the area occupied by the explorers from São Paulo soon had a considerable proportion of half-breeds—a racial type which in Spanish America is called mestizo, but which in Brazil is called *mameluco.*[5] The bandeirantes traveled slowly over the vast interior of the continent, pushing the borders of Brazil far to the west and to the south. Searching restlessly for slaves, gold, or any other sources of wealth, they grazed their animals on the savannas and even stopped to plant and harvest crops on the way. These hardy adventurers established the colony of Colonia on the shores of the Plata opposite Buenos Aires in 1680; they pushed westward to the Paraguay north of Asunción; they even roamed into the Northeast, into the scrub-

[5] The word *mestiço* in Portuguese refers to any person of mixed blood, often mixed white and Negro.

forest country (Map 5) inland from the sugar colonies. Finally, in 1698, they discovered rich gold-bearing gravels in the central part of Minas Gerais (Map 78), on the headwaters of the Rio São Francisco. Shortly thereafter, other gold discoveries were made: at Cuiabá in Mato Grosso in 1719; and near the former capital of Goiaz in 1725. In Minas Gerais, in the country a little to the north of the gold fields, diamonds were discovered in 1729.

The discovery of gold and gems, especially the discoveries in central Minas Gerais, came at a time when the prosperity of the sugar planters of the Northeast had passed its zenith. Declining yields on soils which had been cultivated for many years, and increasing competition from other areas were decreasing profits in the Brazilian region. It is not in the Brazilian tradition, under such circumstances, to aim at greater production through the use of better agricultural practices. Income in the Northeast was spent to raise the standard of living of the aristocracy, not for investments which might lower the cost of production per unit. That would be "planting the trees." Brazil suffered, moreover, from the curse of great area; virtually limitless area meant the ever-present possibility of moving on to new lands and of exploiting new resources; it meant the lack of any compelling reason for the intensification and stabilization of economic life in any one region. When gold was announced in Minas Gerais, the result was a gold rush, in which not only Paulistas and Portuguese from the home country participated, but also many former sugar planters of the Northeast who came bringing their slaves.

The gold period started early in the eighteenth century, reached its peak of development between 1752 and 1787, and was definitely over by the beginning of the nineteenth century. During this time Minas Gerais was transformed from a wilderness into a well-populated agricultural, pastoral, and mining region, dotted with many small towns, and with its rural districts partitioned among a relatively small number of landlords. The settlement of this part of Brazil led to the development of Rio de Janeiro as a port, for this place came to be the chief outlet for the gold, and the chief urban nucleus of the new region of settlement. Great quantities of gold were sent back to Portugal, greatly to the profit of the king and of the mine owners in Brazil. But little of this prosperity was shared by the workers of Minas Gerais. By the beginning of the nineteenth century the best sources of gold and diamonds had been exhausted, and Brazil was ready for a new form of speculative development.

Coffee

Recent Brazilian history has been dominated by the commercial production of coffee, and this activity is concentrated in the state of São Paulo, inland from the city of that name. Like the sugar-cane planters, the people of São Paulo found themselves providing a very large proportion of the world's supply of a new commodity which was rising rapidly in popular favor. Coffee planting started around Rio de Janeiro and at other places on the coast from Santos to the Amazon; but by the end of the first quarter of the nineteenth century there was a definite concentration of coffee in the Paraíba Valley, inland from Rio de Janeiro. From this district, coffee planting spread westward into São Paulo State—a movement which was increasingly rapid after 1850. Most of the European immigrants who came to Brazil after 1850 went to the new coffee lands of São Paulo, with the result that the new region of concentrated settlement was occupied by a very different kind of people from those of the older sections of Brazil. Coffee supported the rise of the great city of São Paulo. Now, in the modern era, São Paulo has become the leading center of manufacturing industries in all of Latin America.

Other Commercial Products

Meanwhile, other agricultural or forest products were leading to the rapid development, followed by the equally rapid decline, of other parts of Brazil. Rubber created havoc in the Amazon valley, rising to a mighty crescendo of speculation and wild spending in 1910, then declining to a very minor position among the world's products after 1912. Cotton, cacao, various wild fruits, nuts, dyes, and other substances led to minor and local flurries of speculation at various times and places. The collection of maté leaves in the Araucaria forests of Southern Brazil is one of these. In each case Brazil, after a period of feverish growth, was forced to yield to other sources of supply, where more intensive methods of production were applied. The result, in Brazil, has been a lack of stability of settlement.

Immigration

Not until the nineteenth century did the population of Brazil increase rapidly. Birth rates were relatively low, and infant mortality was very high because of bad hygiene and the lack of nourishing foods. The immigration of Negroes in the Northeast built up there the densest population of any part of Brazil. In fact, as late as 1870 half of all the Brazil-

Middle Chile. In the midst of a country with shifting patterns of population, handicapped by scarcity of numbers in the face of a vast thinly occupied area, the expanding settlements of Southern Brazil are of special importance and significance to Brazil.

As a result of the rate of population increase in the south, and of the arrival of immigrants in São Paulo, the population of Brazil as a whole has started to increase at a more and more rapid rate. In 1872 there were about ten million Brazilians; by 1920 there were well over thirty million; and at present it is estimated that the number of people in Brazil is a little more than forty million.

The Cities and the Sertão

Before turning to view more closely the relations of people to the land in the various regions of Brazil, one more important fact concerning the distribution of people must be presented. No other Latin-American country illustrates more strikingly the enormous contrast which exists between urban centers and the sparsely populated areas beyond the zones of concentrated settlement. Brazil's cities, like those of other countries, have been making very rapid gains in population and in manufacturing development since the beginning of the First World War. Both Rio de Janeiro and São Paulo have more than a million inhabitants. The impact on the shores of South America of ideas developed in Europe and North America is supporting the growth of great, progressive cosmopolitan centers which appear superficially to be more an expression of conditions outside of the continent than of conditions within it. In these cities new architectural forms are making their appearance and large groups of people, whose lives are now ordered on the urban pattern, are thinking and acting more and more like city people throughout the Occidental world. Industrial society is so new, so much in contrast to the traditional life of the country, and the city people have adopted attitudes and objectives so different from those which have moved the Portuguese and their descendants since before the discovery of America, that some Brazilian writers now insist that the "real" Brazil is not to be found in the cities at all. The real Brazil, they say, is only to be found in the back country—in the thinly peopled wilderness beyond the frontiers of concentrated settlement; in the land which the Brazilians call the *sertão*.[6]

The sertão is not a wilderness in the sense that it is made up of unexplored territory. Actually it has been tramped over, lived in, its resources

[6] Pronounced sair-tong'. The plural is *sertões*, pronounced sair-tó-aish.

exploited, and its landscapes modified in many ways over the course of more than four centuries. The sertão forms a sort of penumbra around the margins of the effective national territory: a transition zone of shifting population, but one in which a way of living has become established which has withstood the forces of change over hundreds of years. Aside from groups of people temporarily engaged in seeking for gold, the economy of the sertão is essentially pastoral—the grazing of herds of cattle on the open range. Scattered throughout the vast area of the sertões there are small groups of people clustered more or less permanently around ranch headquarters or in small towns. Contact with the regions of concentrated agricultural settlement is made through annual fairs held in border towns: beyond the frontier of close settlement the pastoral sertão extends indefinitely inland; its area can be roughly, but not exactly, delimited as the zone with a population density between two and ten per square mile.

The pastoral inhabitants of the sertão are not like the Brazilians in the cities or even those in the agricultural areas. They are almost pure Portuguese with a mixture of Indian. They are essentially democratic, knowing no rigid class distinctions, for the ranch owners look, act, dress, and live like their workers. They are a fiercely independent people, courageous, resourceful, and superstitious; but they are so widely scattered or gathered in such small groups that they cannot support the cost of those numerous things which bring a society forward from a pioneer life to one which can be described as civilized. Here it is likely that the pioneer way of life is permanently established.

To the Brazilian who lives in or around the cities, the sertão is a land of mystery. Its influence on Brazilian economic, political, and artistic thought is profound. The clusters of people along the coast are isolated from each other by this great thinly populated territory. For hundreds of years people have believed that a vast wealth of resources was lying dormant in the interior, and groups of settlers have gone out to seek this Brazilian form of El Dorado; yet the only permanent settlers in the sertão, the only people who have been able to establish a permanent workable connection with the land, are the widely scattered herders. These settlers are not to be thought of as a fringe of pioneers engaged in the first rapid occupation of new lands in advance of a moving frontier: they are, rather, the fragments of population left from the many groups which have attempted to enter and utilize the riches of the interior; they represent a very old, stabilized society in a land long occupied.

We return, then, to our problem: why are there so few people in Brazil?

The answer is not to be found only in those areas where concentrated settlement scallops the eastern border of the country. The answer must also be sought in the regions beyond. Perhaps the persistence of the tradition of collecting the fruit without planting the tree is, itself, a reflection of large area, of which so great a part is sertão. For more than four centuries the Brazilians have been struggling to break that sequence of cause and effect—a sparse population, the resulting predominance of destructive exploitation, and the resulting failure of the system to support more people. For more than four centuries the sertão has absorbed almost every effort to intensify the economic life; after all this time Brazil is still an empty land. But now there are expanding colonies in the South, and there are cities.

13

BRAZIL: THE NORTHEAST

THE NORTHEAST[1] plays a part in Brazilian national life which is somewhat similar to that played by New England in the national structure of the United States. Some of the first colonies of Portuguese in Brazil were planted on the coast of Baía and Pernambuco, around the primary settlement centers of Salvador and Recife (or near-by Olinda). Baía and Pernambuco were the most prosperous states in Brazil during the sugar period. Back of the sugar plantations of the coast there developed a pastoral sertão. Although the sugar industry of the Northeast has long been decadent, the descendants of the planting aristocracy continue to exert a powerful influence on Brazilian political and intellectual life, for this region has produced more than its share of leaders. In no other part of Brazil, moreover, are the inhabitants to such a degree conscious of regional loyalty in addition to state loyalty.

The Northeast is not, however, a simple unit. Within the area between Salvador (in Baía), Teresina (in Piauí), and Cape São Roque there are two strongly contrasted parts, and these parts are differentiated not only by the physical character of the land but also by the racial composition, and fundamental traditions of the people. First, there is the Northeast of the sugar plantations, the part which forms a belt along the coast between Salvador and Natal. Rainfall in this zone is dependable. The thick

[1] The Northeast, as defined in this book, includes the states of Piauí, Ceará, Rio Grande do Norte, Paraíba, Pernambuco, Alagôas, Sergipe, and parts of Maranhão and Baía (Map 78).

semideciduous forest characteristic of the rainy tropics has largely been cleared away, exposing the deep, dark-red soil which develops on crystalline rocks under such a forest. Plantations are large and devoted to the cultivation of sugar cane. The workers are mostly Negro and mulatto who are dominated by a small group of white plantation-owning families. There are important differences between the parts of this sugar region which focus on Salvador and the parts which focus on Recife; but altogether, the zone of the sugar plantations stands in striking contrast to the "other Northeast."

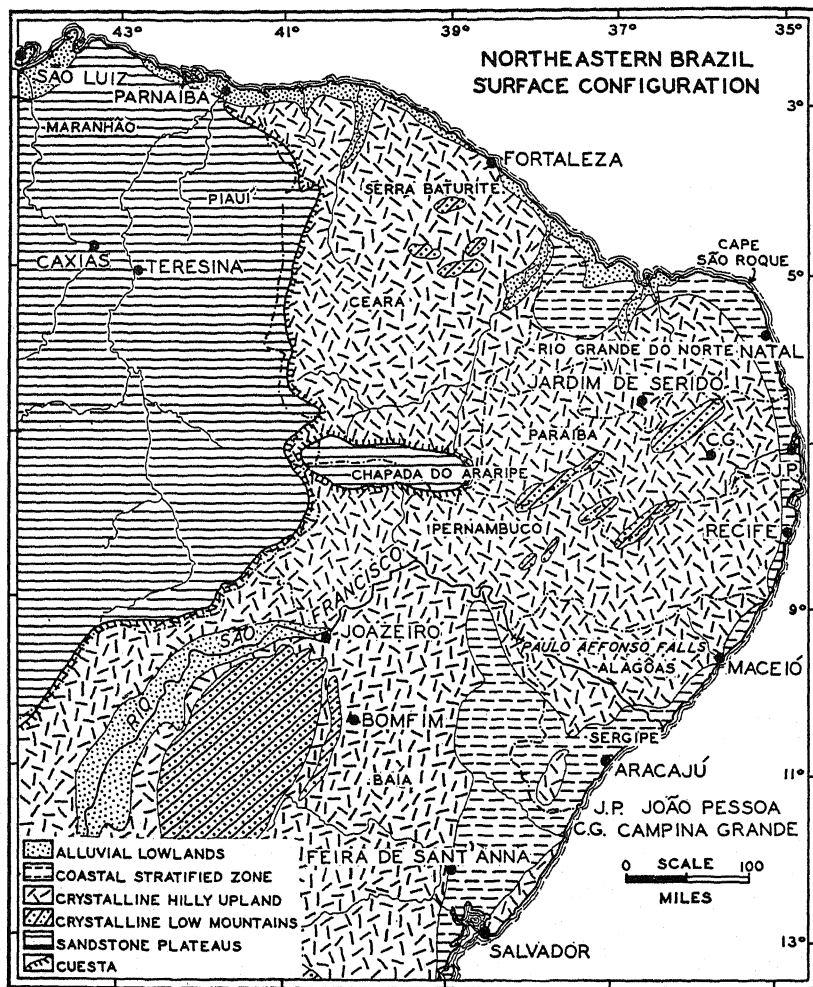
This other part is the Interior, bordering the coast north of Natal. It is a land of recurring droughts, of scrub forest standing on a soil which is hard, sandy, and light-colored; a land devoted largely to the pastoral life, but with little islands of agriculture where water is dependable. The Interior is occupied by people of Portuguese or Portuguese-Indian origin, only very slightly mixed with Negroes. Throughout the long course of Brazilian history these two Northeasts, the Coast and the Interior, have been closely linked by a common tradition, yet at the same time they have remained as sharply contrasted as black and white.

THE LAND

The essential difference between the two parts of the Northeast existed before the arrival of the Europeans, although the border which separates one from the other was sharpened by the process of settlement. The fundamental contrast is one inherent in the character of the land itself.

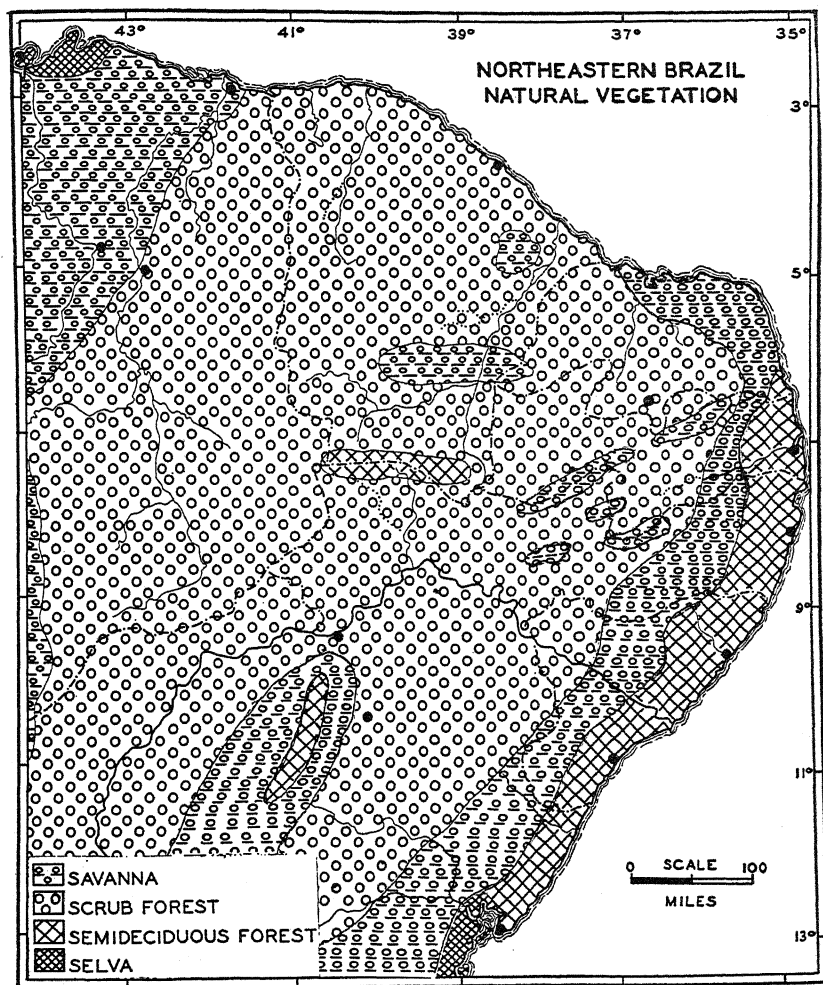
Surface Features

The three basic elements which combine to make up the surface character of the Brazilian Highlands are all represented in the Northeast (Map 80). The basement of crystalline rocks, once covered with strata of sandstone, is now partly exposed, forming a surface of gentle slopes. This surface varies in height from a thousand to fifteen hundred feet above sea level in the northern part of the state of Baía to only a few hundred feet above the sea in Ceará. Scattered over the crystalline uplands there are many low knobs, groups of hills, and ranges of low mountains—only the largest of which can be shown on the map (Map 80). These are all remnants of erosion and denudation, standing above the general level of the hilly upland because of their superior resistance to the destructive action of air and water. The third surface element is the cover of sandstone strata, now partly stripped off by erosion. The eastern limit

of the main body of the sandstone plateau forms a prominent east-facing cuesta which runs north and south along the border between the states of Piauí and Ceará. East of the main cuesta, however, there are mesalike

Map 80

outliers, capped with sandstone. The largest of these is the Chapada do Araripe.[2]

[2] For persons trained in physiography it is interesting to note that this crystalline upland of the Northeast, sloping gently toward the coast of Ceará, north of Cape São Roque, is one of the few examples known in the world of a peneplain which is still essentially in place. The arrangement of the drainage, too, is of interest. The rivers, apparently, were established in their courses on the overlying sandstone, but as this cover was stripped off the rivers became superim-

In a zone of varying width along the coast the crystallines have been covered with relatively young layers of sand and clay, now solidified into sandstone and shale. The sandstone and shale are of more recent origin

Map 81

than the thick sandstones of the interior plateaus. The coastal stratified zone begins in Ceará, and narrows as it passes Cape São Roque and approaches Recife. It extends well inland in northern Baía, surrounds the bay of Baía, and thence runs southward as a narrow belt along the coast

posed on the underlying crystallines. One of the best descriptions of these surface features is given by Pierre Denis (1).

of southern Baía. The streams which cross this coastal zone have cut through the upper sandy layers, leaving low mesas, or *taboleiros*, standing above the valleys. These mesas are dry because of the porosity of their sandy soils. Along the valley bottoms, however, the underlying shale has been uncovered, and in the bottoms of the deeper valleys, even the crystallines appear; these valleys offer the best cropland of the coastal zone. The taboleiros stand about 200 feet above sea level in the district just south of Cape São Roque; but in Baía they are more than 600 feet high.

A geologically recent submergence of the coast has drowned the mouths of the rivers both around the bay which gave Baía its name, and around São Luiz in the state of Maranhão, which lies just beyond the border of the Northeast as here defined. Most of the coast line is made up of offshore bars and lagoons which are filled with a dense growth of mangrove. The bars, north of the Rio São Francisco, have been cemented by chemical action of the lagoon waters to form stone reefs; an opening in one of the reefs, permitting access to the quiet lagoon behind it, provides a small natural harbor for the port of Recife.

Climate and Vegetation

The fundamental contrast between the two parts of the Northeast, however, is a result of climatic differences and of resulting differences in the natural vegetation and soil. The coast south of Cape São Roque receives regular rains, brought by the cold air masses as they push far to the north in the southern-hemisphere winter. Recife, for example, receives an average annual rainfall of about 65 inches, most of which occurs between April and July. This coastal zone of abundant rains extends inland for only about forty or fifty miles in Pernambuco, but becomes wider and wider toward the south. On the coast northwest of Cape São Roque, São Luiz de Maranhão receives an average annual rainfall of about 85 inches, most of which occurs between January and June, as in the eastern part of the Amazon Basin. These rains, we may recall, are brought by the indraft of warm, moist air from the equatorial North Atlantic. Between eastern Maranhão on the west and the coast of Pernambuco on the east lies a triangular-shaped zone of irregular rainfall, subject at intervals to floods and droughts.

Friedrich Freise has made an important study of the drought area of the Northeast (165), and has produced what he calls a map of "calamities" (Map 84). He finds three little areas where the rainfall average is

very low, but where during the period from 1835 to 1935 there were more than fifty years of flood or drought. Other parts of the area show varying tendency to recurring calamities. He finds that, in so-called good years, about 90 per cent of the rain in the drought area falls between December and April or early May. Generally the rains start in October —the first showers being known as the *cajú* rains, because the tree, which produces the edible cajú nut, buds forth with new leaves and flowers at this time. In the rainy season the moisture is brought in violent showers of brief duration and of small extent. The whole rainfall of a month may be brought by four or five violent showers, all occurring within a few days of each other.

In bad years several irregularities may appear. Sometimes a whole year may pass in certain localities without any rain at all. Sometimes there are rains in December and January, but none after that. In other years there may be no rain from January to the end of March, followed by excessive downpours in April and May. Any of these departures from the normal results in disaster for the farmers, and if several abnormal years come in succession, there may be a widespread failure of the pasturage on which herders must depend.

The natural vegetation of the Northeast reflects these climatic contrasts. The zone of heavy, dependable rains along the coast was marked by a dense semideciduous forest, becoming an evergreen tropical rain forest in southern Baía (Map 81). Tropical rain forest also covers the land in Maranhão. Between lies the *caatinga*, a scrub-forest type which is adapted to the irregular periods of deficient moisture. In normal years the rainfall is by no means deficient, and the caatinga in many places forms a dense growth. Leaves are shed during drought, thus enabling the trees to survive. Large areas of the caatinga have been cleared for charcoal or simply burned to make more room for the growth of pasture grasses. In most parts of the region the margins of the streams are followed by the usual fringe of galeria forest, but in the drier spots where the streams dry up completely in the dry season, and form only pools of salty water even in the rainy season, there is not even this fringe along the stream banks. However, in certain localities within the region there occur almost pure stands of trees of considerable potential economic value in the modern world. The palm which produces Carnauba wax, important in the manufacture of such things as phonograph records, is one of these; there is also the tree which produces Oiticica oil, a possible substitute for Tung oil in paint and varnish manufacture, which is found in the galeria forests especially of Rio Grande do Norte and Ceará.

SETTLEMENT

The earliest colony along the coast of Brazil was established at Salvador, in Baía. In the first decades of the sixteenth century the only product of the Northeast was dyewood from the semideciduous forest. The dyewood was taken to Lisbon where it was found to be similar to Brazil wood, which was commonly in use for dyeing in the middle ages. The name "Brazil" had already been applied to some islands which were supposed to lie in the Atlantic, and it was easily extended to the new land after dyewood was discovered there. During the first decades of settlement in Baía, the colonists learned from the Indians how to grow tobacco; this part of Brazil has been famous for its production of high-grade tobacco for more than four hundred years.

Sugar Plantations

After a few decades, however, the Portuguese began to sense the possibilities of profit from the commercial production of sugar cane. This Moorish crop, already familiar to the Portuguese through their experience with cane plantations in the Madeira Islands, gave excellent yields in the coastal region around Salvador and Recife. The most productive sugar-cane soils were those developed on the crystalline rocks under the semi-deciduous forests. The sandy taboleiros of the immediate coast were of little agricultural value; and the yield of cane dropped off rapidly as one pushed farther inland beyond the inner edge of the tall forests. The deep soils on the crystalline rocks, enriched by a humus content exceptional in rainy tropical soils, were extraordinarily productive when they were first put to use. Forest clearing and cane planting spread rapidly, especially in two districts: around the bay in the state of Baía, a district known as Recôncavo; and inland from Recife in the state of Pernambuco.

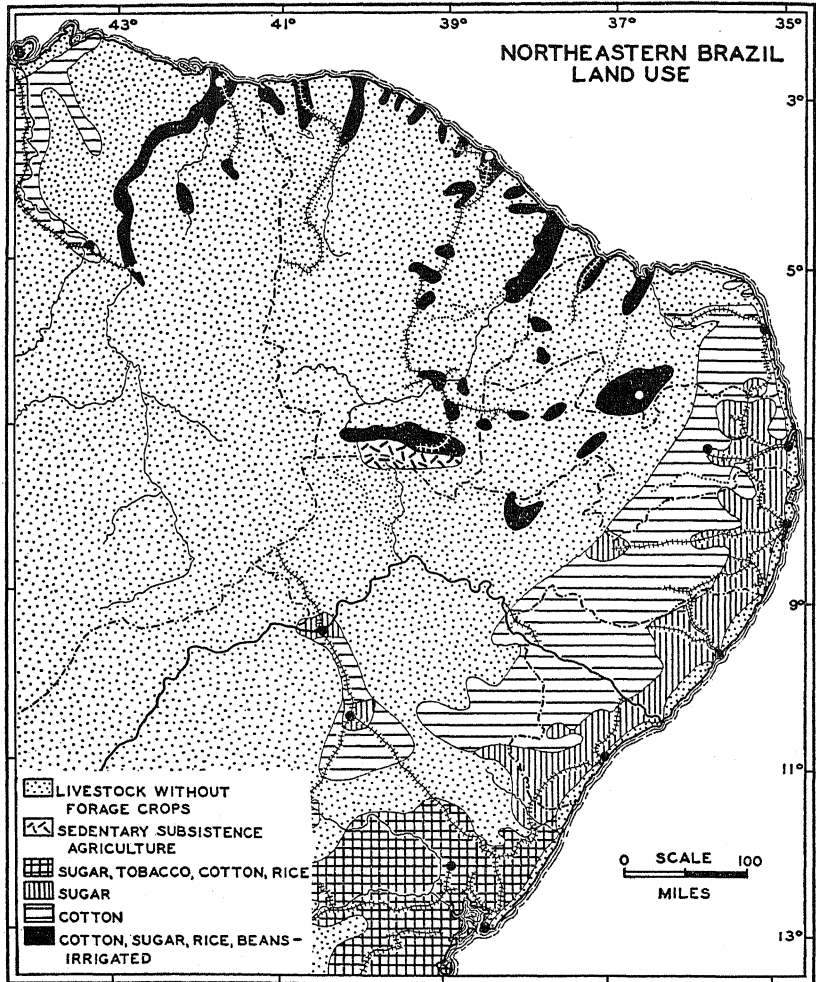
After 1538 in Salvador and after 1574 in Recife, Negro slaves were imported in large numbers. From then on, the population of the sugar region of the Northeast comprised four classes: the Indians, who survived in considerable numbers only in Baía; the Negro workers on the plantations; the Portuguese landowners who drew a sharp color line against intermarriage with the black people; and the poorer people of Portuguese descent who were not landowners, many of whom took Indian or Negro wives, and most of whom settled in the towns and cities as small traders or fishermen. On the plantations, or *fazendas*, the wealthy landowners built themselves substantial homes of stone and

cement, erected churches, and set up the big *engenhos*, or sugar mills. In contrast to the *casa grande*, or the home of the plantation owner, were the miserable *senzalas*, or slave quarters, built of mud and thatch (166).

The sugar lands were soon occupied by a relatively dense population. As the children of the first plantation owners grew up and married, they were established on new plantations, with new engenhos, often utilizing virgin land in the same valley as the parental estate. Little by little the plantation area was extended until it covered all the good soils, and perhaps even pushed for short distances into the bordering scrub forest. Nevertheless, the striking contrast in vegetation and rainfall dependability led to the development of a sharply defined frontier, and to the growth of compact settlement in the agricultural area. Had this first zone of settlement been located in a position where the semideciduous forests and good soils extended indefinitely inland, it is quite possible that the population density necessary to support the cost of a civilized way of living for the aristocracy could not have been built up. In this case the importance of a rather striking natural contrast was enhanced in the course of settlement by a people whose way of living was not adapted to the sertão.

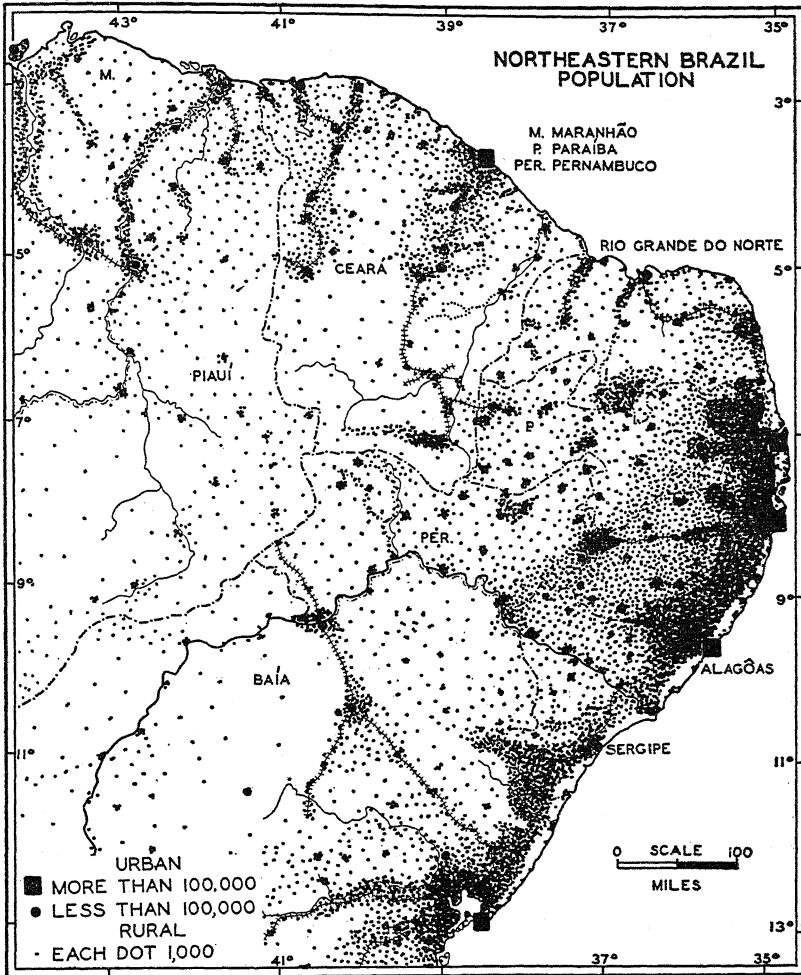
Settlement of the Sertão

The first people to push westward into the sertão came from the towns and cities of the sugar region. In the rural districts of the coast there was no room for a white worker, and for many life in the towns was intolerable. Some of these poorer people who came to the Northeast were newly converted Jews, or *christãos novos*, who, like the settlers in Antioquia, were seeking a refuge in the New World. Many of the Portuguese who were too poor to own land and felt themselves ill adapted for life in the towns, moved out beyond the frontier into the sertão. With herds of cattle to provide them with food and with something to sell, they were sufficiently nomadic to avoid the worst effects of droughts and floods. These pastoralists established estate headquarters and used the wide expanse of grazing land in the scrub forests with little attention to property lines. The chief areas of pastoral activity were in the state of Ceará, inland from Fortaleza, and along the lower and middle course of the Rio São Francisco, in the state of Baía. Contacts with the sugar colonies were made chiefly through the fairs held at frontier towns, of which the most important were at Feira de Sant'Anna in Baía, and at Campina Grande in Paraíba. Meanwhile, a few spots of agricultural

settlement appeared in the midst of the sertão—at the northern base of the Chapada do Araripe, in the vicinity of Jardim de Seridó, around the

Map 82

low mountain groups south of Fortaleza, and in small areas elsewhere. These settled spots have persisted to the present time (Map 82); they still produce chiefly food and other materials for the use of the pastoral people.

Life went on, therefore, along very different lines in the two contrasted parts of the Northeast. Yet the contacts between the sertão and the sugar plantations were not so remote that the mystery of the wilderness

failed to be impressed on every child brought up in the centers of concentrated settlement.

Map 83

Decadence of the Sugar Plantations

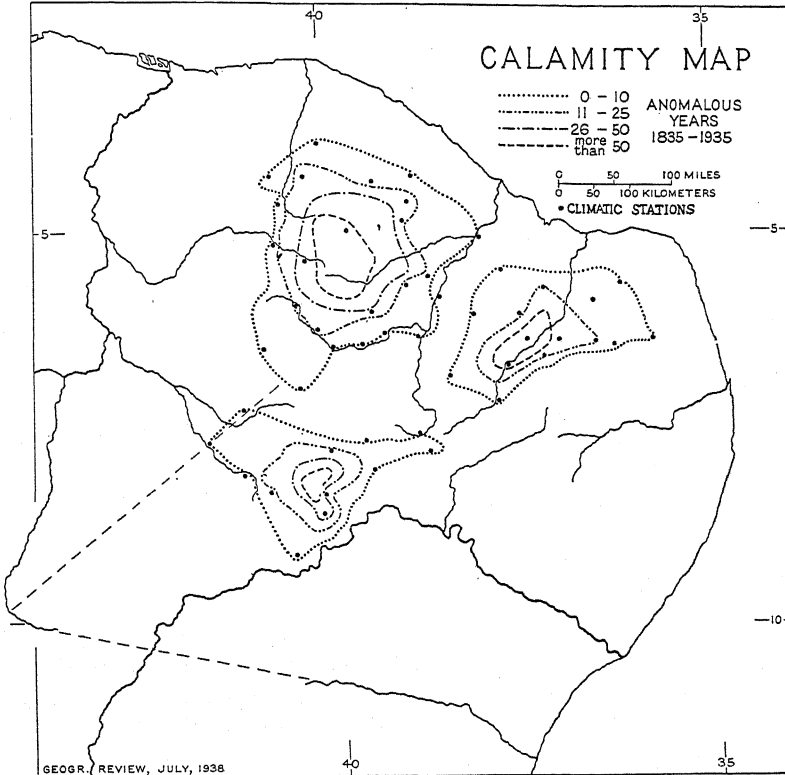
The process of decadence in the sugar plantations, which set in about the beginning of the eighteenth century and has continued to the present, has been a long and irregular one. When gold was discovered in Minas Gerais, and diamonds shortly afterward, the profits to be made in sugar were no longer so great that this new form of speculation did not have

its immediate appeal. Between 1710 and 1720 there was a strong movement out of the Northeast, especially out of Baía, in which many plantation owners moved southward with their slaves, following the valley of the Rio São Francisco to its headwaters in the mining region of Minas. From 1729 to 1745 the movement was revived, leading to the newly opened diamond fields of northern Minas Gerais and southern Baía. It is estimated that 500,000 people left the sugar lands of the Northeast before the middle of the eighteenth century. Between 1780 and 1790, there was another big exodus of owners with their slaves, involving some 150,000 people, according to Freise, this time to the state of Maranhão, where a new coffee frontier was being established. Early in the nineteenth century some 100,000 people left the Northeast for the new coffee frontier in the Paraíba Valley, inland from Rio de Janeiro.

All these emigrations, however, did not permanently reduce the number of people in the agricultural part of the Northeast (Map 83). As plantations of sugar cane were abandoned, or held for sale at low prices, people from the sertão moved in, occupying chiefly the outer zone of the agricultural area. In most cases these newcomers were people who had previously farmed in the sertão, and the crop they brought with them was cotton. The low population density of the sertão was continued as a result of the process of decadence and abandonment in the neighboring zone of the plantations.

Meanwhile the sugar industry was being changed from one which competed for a place in the international markets, to one which survived on the domestic market behind a tariff wall. Two events after the middle of the last century combined to eliminate Brazilian sugar from an important place on the world markets. The first was the establishment of large-scale sugar production in the West Indies. Sugar mills there, equipped with new types of machinery, and receiving cane from a large surrounding area over a system of railroads, were able to reduce the costs of production far below those of the inefficient engenhos of Brazil. The second was the emancipation of slaves in 1888, which dealt a final blow to the old plantation system of the Northeast.

During the past fifty years the sugar of the Northeast has gone almost exclusively to domestic markets; but the domestic market has been a rapidly growing one and has been amply protected by tariffs against imported sugar. Brazilians consume large quantities of sugar per capita, for with each cup of coffee—and the average Brazilian drinks many cups of coffee every day—four or five spoonfuls of sugar are used. Rapid increase of population in the Southeast and in São Paulo created a

new market for the sugar planters of the Northeast, and helped to prolong the existence of an industry already decadent. Other competing areas of sugar production in Brazil have gradually cut down the share of the Northeast, until, in 1937, the state of São Paulo alone accounted for more than half the supply.

MAP 84. DROUGHT AREA OF NORTHEASTERN BRAZIL

(Courtesy of the *Geographical Review*, published by the American Geographical Society of New York.)

Meanwhile the economic organization of the sugar lands of the Northeast has been transformed. The old plantations with their landowning aristocracy, their slave or tenant workers, and their small-scale mills, or engenhos, have gradually disappeared. Companies organized as commercial enterprises have bought many of the plantations and now cultivate them with wage workers hired from among the tenants of the old estates. On these new plantations the cane from a wide area is brought to new, modern, large-scale sugar mills, or *usinas*. Where sugar production survives today in the Northeast, it is on this new basis.

Cotton in the Northeast

While the sugar industry was going through this long slow process of decadence, a new crop was appearing in the Northeast and was taking its place among the leading exports of Brazil. This was cotton. Cotton is planted in many small scattered areas throughout the sertão from Maranhão to Baía; but the chief cotton region is on the margin of the former sugar lands in Pernambuco, Paraíba, and Alagôas. The first expansion of cotton planting in the hinterland of Recife took place about 1750, as people from the interior began to move into the region of the sugar plantations. Since cotton can be grown where there is less rainfall than is required for sugar cane, the margin of the agricultural land moved farther inland, into the scrub-forest area, and the frontier lost some of its sharpness. The territory around Jardim de Seridó came to form a transition zone between the predominantly black, very densely populated sugar area, and the white, but thinly populated sertão. The North American Civil War brought about a great rise in cotton planting in Brazil; and when the peak of this period of production was reached in 1871–72 the Northeast accounted for about 85 per cent of the cotton exports of Brazil. In that crop year, over 350,000 bales were sent to foreign markets.

Unfortunately the statistics of cotton production do not always make clear the fact that two very different kinds of cotton are produced in the Northeast. From the drier parts of the sertão comes the Brazilian "tree-cotton," which has a long, silky and very strong fiber. This type of cotton is very much in demand, especially for the construction of automobile tires. The largest volume of cotton from the Northeast, however, is a short staple variety like the upland cotton of North America, a product which runs directly into competition on foreign markets with supplies from areas where production is generally cheaper than it is in the Northeast.

Cotton, like sugar, has failed to provide the basis of a stabilized economy in the Northeast. With the increasing competition on the world market of the less expensive cotton from North America, Brazilian short-staple cotton was gradually confined to the domestic trade. The big droughts of 1877 to 1879 brought disaster to the cotton planters, and contributed to the large migrations of people in 1878 to the rubber forests of the Amazon. In the modern period when cotton is consumed in increasing quantities in the textile factories of São Paulo, a relatively small proportion of the short-staple variety comes from the Northeast.

Of all the cotton produced in Brazil, however, the Northeast accounts for about half.

The people of the Northeast have been seeking other products to supplement the failing sugar and cotton. The most promising developments seem to lie in the cultivation of the palm which gives Carnauba wax, or the tree which gives Oiticica oil, or the Mamona plant which gives castor oil. Most of these waxes and oils are still collected from wild sources. There are many plans for the establishment of plantation production, and some little progress has been made. The relatively dense population of the old sugar region would suggest that an abundance of labor could be found, but the capacity of these people for work is said to be low because of the prevalence of bad health conditions.

Characteristic Fazenda of the Agricultural Northeast

The large estates which in Brazil are known as *fazendas* have certain peculiarities which distinguish those of one region from those of another. The fazendas of Pernambuco, Paraíba, and Alagôas in the agricultural zone inherit many of their features from the colonial days of sugar prosperity. On a few of the estates the casa grande is still occupied by descendants of the sugar aristocracy who cling to the genteel rural life of an era which ended with the emancipation of the slaves. The majority of the landowners, however, no longer reside on their estates. The senzalas, in which the agricultural workers of the earlier period lived, are no longer in common use. The tenants on the typical fazenda of the Northeast occupy scattered, isolated homes, dispersed over the land as widely as possible, and are more permanently attached to particular estates than is common in Brazil as a whole. At the present time, the laborers who are hired by the day to work for the large usinas are brought together from homes widely scattered over the plantations.

In the cotton area of the Northeast the tenants are less permanently attached to the land than in the sugar area. The homes they occupy are as widely scattered as elsewhere in the hinterland of Recife; but the tenant families come and go with little idea of forming permanent connections. The large landowners, as in Argentina, are, first of all, cattlemen. They find that in order to prepare pasturage for cattle they must clear the brush; and they find that the best way to clear the brush is to contract with tenants for the temporary use of a part of the fazenda for agriculture. Each large estate in the cotton area, therefore, has some of its land each year planted to cotton by tenants, who in some cases pay no rent, and

whose part in the system is essentially to prepare the land for use as pasture. As in the case of the Argentine grain farmers, these producers of cotton can increase or decrease their crop with a minimum of dislocation or financial loss.

Baía

The section of the Northeast which lies within the hinterland of Salvador has certain peculiarities which distinguish it from the country north and west of the Rio São Francisco. This territory includes the states of Baía and Sergipe. It is notable that since the emancipation of the slaves in 1888, the district of Recôncavo around the bay of Baía has enjoyed a renewed prosperity. In fact, this area is distinctly unusual in this respect, for the former slaves in other parts of Brazil have not showed much energy in reconstructing the economy of the regions in which they form a considerable proportion of the inhabitants. Whether this is due to inherent laziness, lack of stimulation from the climate, bad health, or bad diet, or a combination of all of them, is difficult to say. Nevertheless, it is important to note that the Negroes of Baía are not of the same origin as most of those elsewhere in Brazil. According to Arthur Ramos, Brazilian student of the Negro question, the black people of Baía are mostly Sudanese, whereas those of other parts of the country are Bantus. At any rate, the descendants of the slaves in the Recôncavo district have shown uncommon energy in rebuilding the agriculture of the area. The land is now divided into small farms, worked by Negro and mulatto owners. The crops grown include sugar cane, tobacco, cotton, and rice, together with such native food crops as manioc. Salvador is still of importance as a source of tobacco of good quality.

Because of this relatively prosperous group of Negro farmers in the Recôncavo district, the state of Baía as a whole has a larger proportion of Negroes and mulattoes than any of the other divisions of the Northeast. According to Brazilian estimates, the Northeast as a whole is occupied by a population which is 36 per cent white, 12 per cent Negro, and 51 per cent mulatto, with only 1 per cent Indian and mameluco. In Baía, however, only 33 per cent of the inhabitants are white, 19 per cent are Negro, and 47 per cent are mulatto.

Salvador is not only the focus of the densely populated Recôncavo district, but also of a wider area beyond. A railroad has been extended across the sertão to Joazeiro, above the falls on the Rio São Francisco (Map 82). Between Joazeiro and Pirapora in Minas Gerais (Map 86)

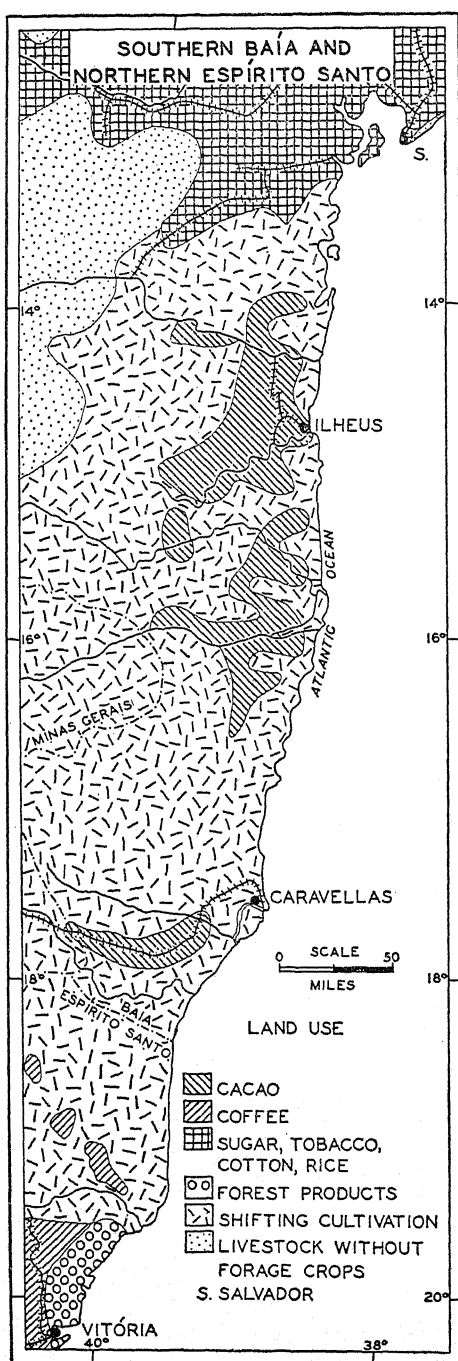
the São Francisco is navigable, and small steamers collect the few products of this vast area from many little ports along the river. At least the northern part of the São Francisco Valley lies within the hinterland of Salvador.

Cacao District of Baía

An important cacao district along the coast of southern Baía and northern Espírito Santo (Map 85)[3] is also tributary to Salvador. Ilheus, the chief port of southern Baía, was one of the very early towns to be established in Brazil (1532), but Indian raids during the sixteenth and seventeenth centuries left the Portuguese clinging only to a few places that could be defended from the interior. Not until the middle of the eighteenth century (1746) was cacao planted in the country back of Ilheus; then the warm and rainy climate of this region proved to be so ideally suited to the cacao tree that, from then on, the plantations have been expanded little by little. Since 1890, especially in more recent years, the expansion has been rapid, and in 1930 this region produced 95 per cent of Brazil's cacao. In fact, southern Baía is now second only to the Gold Coast of Africa among the world's cacao producers, accounting for 19 per cent of the world production in 1939.

The land suited to the planting of cacao is restricted to a zone parallel to the coast and some fifty to a hundred miles in width. As in the part of the Northeast which lies north of Salvador, the deep soils developed on the crystalline rocks have proved to be more productive than the porous, sandy soils of the taboleiros. At Ilheus the crystallines extend eastward to the ocean, producing one of those harbors with sugarloaf mountains so characteristic of the Brazilian coast. Only around Ilheus does the zone of cacao plantations reach the sea; elsewhere it begins some twenty to thirty miles inland, either on the crystallines, or on the alluvial terraces of the river valleys.

On the western side, the cacao district is restricted by the rising slopes of the Great Escarpment. This striking feature of the Brazilian coast reaches its northern limit just south of Salvador. In Baía it is made up of a series of parallel escarpments forming a zone of increasing elevation toward the interior. Since the cacao tree does not do well above 600 feet, the extension of the plantations inland is limited to the deep, and mostly narrow, river valleys.

[3] The cacao district cannot be said to belong to the Northeast as the Brazilians understand that region. It is included here only because of its position in the economic hinterland of Salvador.

MAP 85

Plantation practices in Baía are notably extensive and exploitive. In spite of experience gained on a few well-run plantations, on which sustained yields have been maintained for more than a hundred years, most of the plantations continue productive for only forty or fifty years. Contrary to the advice of experts, most of the plantings are made on land from which the selva has been entirely cleared away. Once planted, the young trees are given almost no attention until they come of bearing age—after seven or eight years. Thereafter, instead of clearing away the brush and weeds each year, this kind of work is done only every four or five years. When yields decline, the older plantations are abandoned and new ones are set out on virgin soils (169).

The system of land tenure is one of the important causes of this form of destructive exploitation. During the period of the First World War many of the plantation owners mortgaged their estates, which at that time were increasing rapidly in value. With the subsequent collapse of values after the War, most of the cacao plantations came into the hands of the banks. Since that time there have been few resident owners—no aristo-

cratic landowning group remains on the land, even part of the time. The present owners are business men, not planters; properties belonging to one man may be widely scattered throughout the area, and on each plantation perhaps no more than a resident manager and a few workers are regularly employed. Here is speculative and destructive economy at its worst; one that is bringing temporary and unstable activity to such places as Ilheus and Salvador.

The population density of this cacao district is unusually low compared with that of other cacao-growing regions. Most of the laborers who are needed for the work of harvesting the pods, cleaning out the cacao seeds, and transporting the finished product, are migrant workers who do not remain permanently in the region. During the harvest season—from April to December—many men enter the cacao district, coming in large part from the sertão of the Northeast. About the middle of December they start back to the interior, always planning to spend the New Year season at home. This regular and now long-established seasonal migration of workers links the cacao district more than any other agricultural area of the Northeast to the people of the sertão.

The Pastoral Sertão

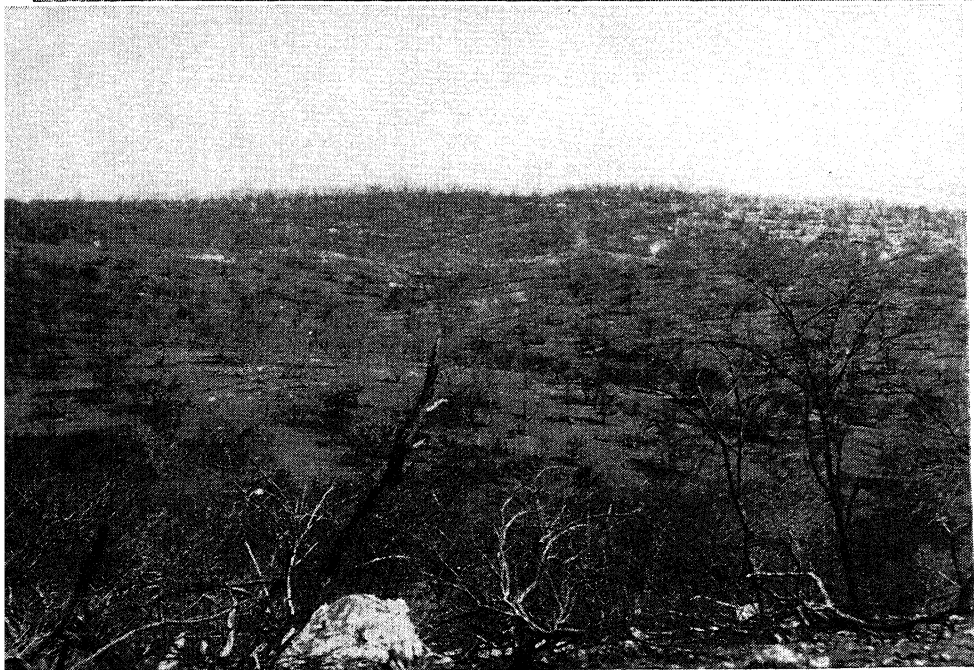
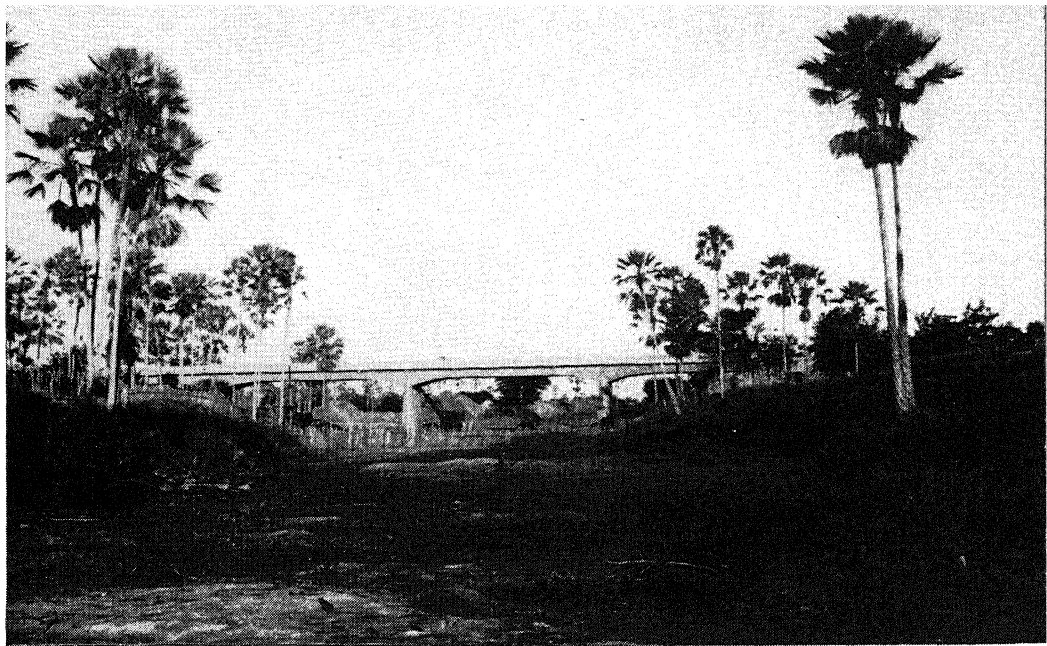
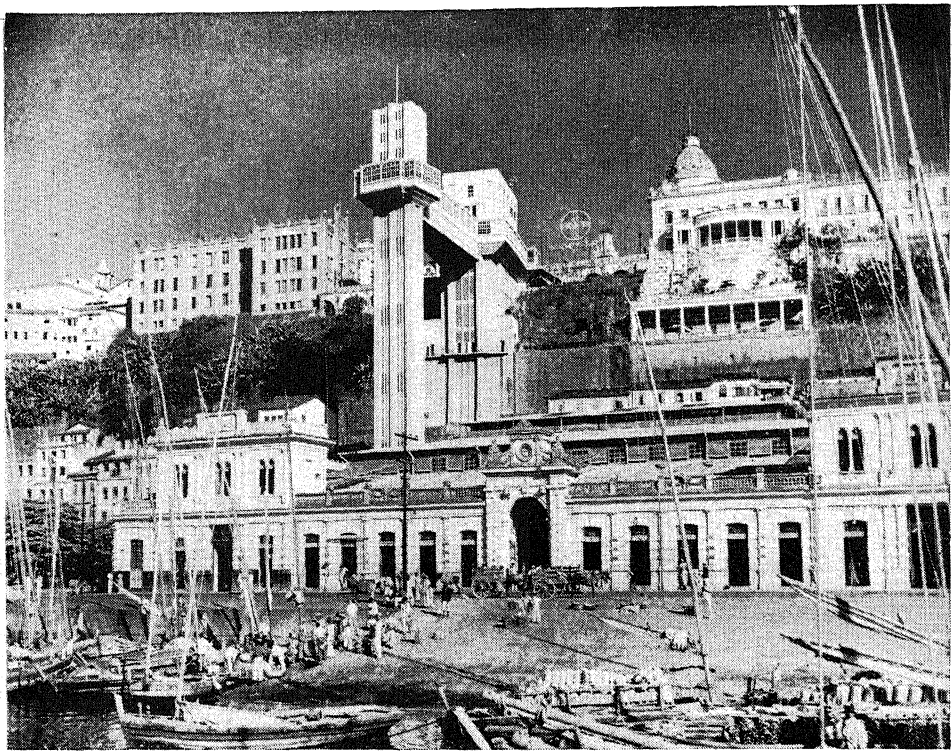
The coastal regions of the Northeast are in striking contrast to the Interior—the sertão. The sertão is a land subject to drought and flood—a land of natural calamities. It is a pastoral country, in which the predominantly white population derives the major part of its food from meat, in contrast with the agricultural coast lands, where a population which is more than half black subsists principally on a vegetable diet. The people of the sertão are individualists, energetic and resourceful; but they are a people who resist any change in the way of living which, over centuries, has provided the greatest measure of security in this uncertain habitat.

The line between the agricultural zone and the pastoral zone is a sharp one. In fact it has an exact legal definition. The line of separation is called the *travessão*. On the coastal side of this boundary, any one who wishes to use his land for pasture is required by law to erect a fence to keep his animals from roaming over the unfenced crop areas. On the interior side of the boundary, lands to be used for crops must be fenced; the pastures remain entirely open. During the last fifty years the rise of cotton cultivation has had the result of moving the travessão farther into the interior, broadening the coastal zone devoted to agriculture: but beyond the line of demarcation, now, as in the past, lies the sertão.

In the pastoral sertão many of the estates are operated in common by a group of people, rather than as individual holdings. In some cases the original grants of land were *sesmarias*, given by the Portuguese king. The numerous descendants of the first owners inherit the right to pasture a certain number of cattle on the undivided estate, and other people, in the course of time, have purchased such rights. To divide the estates among the heirs would greatly decrease the security in a land subject to droughts. Where a man establishes a home and makes use of a specific piece of land for a period of thirty years, individual ownership is legally recognized; but, in the sertão, settlement of this degree of permanence is limited to the wet spots.

Throughout the sertão variable amounts of land are devoted each year to the production of food crops. During good years, small openings in the scrub forest, carefully protected from grazing animals by brush fences, are planted to maize, beans, and other vegetables, watered by natural rainfall. In dry years these little gardens are ruined and there is a shortage of food. Even in good years, however, the people of the sertão use crops only to supplement their diet of meat.

In a few spots, on the other hand, the sertão is suitable for permanent agriculture under irrigation, and these spots are densely occupied by a farming people (Maps 82 and 83). A large cluster of farming people is located at the northern base of the Chapada do Araripe, where springs emerging from the cliffs bring water to support fields of cotton, sugar, and rice and other food crops. For a long time the somewhat wetter lands around Jardim de Seridó have been utilized for the production of cotton. Another important concentration of farming is on the Serra de Baturité, near Fortaleza. Here, and in several smaller wet spots near by, agricultural products are raised chiefly for consumption by the herding people, including coffee and sugar which is made into brandy (*caxaça*). Small agricultural areas producing in part for the cattle herders are also to be found along the Rio São Francisco, and at the base of the mountains in central Baía. Here cotton and sugar are raised for export. There is a close economic relation between the scattered pastoral people and the agricultural people, who are grouped together in clusters.

The curse of the sertão, for both pastoralists and farmers, is the repeated calamities of flood and drought (Map 84). During the early centuries of settlement, there were so few inhabitants that the herders could escape the worst effects of these disasters. During the eighteenth century the shifting of settlers from the sertão into the outer margins of the agricultural region repeatedly reduced the population pressure of the interior.

Both of the photographs on this page were taken in the interior of Ceará, Brazil, where the Federal Government has built several all-weather roads and bridges, like the one shown above. In times of flood the water fills the dry channel and overflows its banks. The palms, growing characteristically near a water-course, are those from which carnauba wax is extracted. The lower picture shows the *caatinga* or dry scrub forest of the *sertão*. Herders riding through this country

The oldest capital city in the Americas is Salvador, in Baía, Brazil. This city is built on two levels, one almost 200 feet above the other. Elevators serve to connect the two sections. The small sailing boats seen in the foreground are used to bring goods across the bay from the densely populated Recôncavo District. (Courtesy of Moore-McCormack Lines.) The lower picture shows a cattle fair at Feira de Sant' Anna. These cattle are zebu hybrids; they are immune

Not until the nineteenth century were so many people living in the sertão that the problem of surviving the calamities became critical. Since then floods and droughts have commonly been followed by a vast influx of refugees into such coastal cities as Fortaleza, where they remain until conditions in the interior improve.

Between 1877 and 1879 the interior of Ceará was visited by one of the most prolonged droughts in its history. The economic life of the whole interior was disrupted, and great numbers of refugees came to the cities. Fortaleza grew in a short time from a town of 30,000 people to one of 125,000, and the problem of feeding so large a number became critical. It was at this time that the rubber boom was getting started in the Amazon forests, and the demand for rubber gatherers far exceeded the possible supply of workers in that region. In 1878 about 54,000 people left Ceará to gather rubber along the far stretches of the Amazon and its tributaries. Most of these people never returned; today the old rubber sections of the Amazon are largely occupied by the scattered descendants of people who came originally from Ceará.

Similar but less spectacular emigrations occurred during other years of drought, especially in 1915 and 1932. Commonly the Northeasterner who migrates to other parts of Brazil leaves only temporarily; if it is possible for him to return to his native land he does so. Most of these migrations have had no permanent effect in reducing the population of the Northeastern sertão.

The first steps to be taken by the Brazilian government to attack the problem of the droughts were made between 1880 and 1889 by the Emperor Dom Pedro II. During the last decade of the empire he had a number of earth dams, lined with stones, constructed along the watercourses of the area with the intention of conserving the water and protecting the valleys against flood. But the plans were faulty; the dams were soon washed out or the reservoirs filled up with silt.

The attention of the federal government was again directed to the Northeast when, in 1910, a special commission began to study the causes and effects of the droughts. The *Inspetoria Federal de Obras contra as Secas* undertook to make a thorough inventory of the area—to collect weather records, to make maps, to study the distribution and quality of the water supply, and to chart the existing character of the vegetation cover and the land use. The result has been a fine series of maps and publications dealing with various aspects of the region.[4]

[4] See the bibliography contained in references 1 and 3; see also the studies by Freise listed in reference 165.

On the basis of these studies a number of steps have been taken to diminish the worst effects of the calamities. Nearly a hundred reservoirs, some built by the municipalities, some by the federal government, have been constructed. Considerable difficulty has been encountered, however, by the failure of the inhabitants to co-operate in the use and maintenance of systems of irrigation. Most of the water-control works which had been built before 1910 were privately owned units of small size. To expect the highly individualistic people of the sertão to work together for the public control of water was expecting too much.

In addition to reservoirs and flood-control works many miles of automobile roads have been constructed. Motor trucks can now be hired by the planters to bring the bales of cotton to the railroads, and most of the long-distance transportation away from the railroads is now done in this manner. Mules still furnish the chief means of bringing the farm products short distances to the local markets.

Here, then, are the two Northeasts: one facing the problem of a decadent agricultural system; the other facing the results of recurring natural calamities. Here we have been able to examine a region in which the peculiarly Brazilian relationship between a speculative agricultural zone and a bordering sertão has had its first, and perhaps its most typical, development.

The sertão of the Northeast remains Brazil's chief problem area. Freise's recommendation is not encouraging: "Perhaps those periodic calamities, which not only affect the northeastern states but have their repercussions throughout the life and economy of all Brazil, could be at least mitigated, if not overcome, by a controlled and methodical evacuation of the regions most frequently hit by drought, by limiting reservoir construction to those areas where the incidence of drought is not so severe, and by shifting agricultural activities to such special crops as are really suited to semiarid country" (165, p. 378). On the other hand, many Brazilians believe that the sertão, if properly supplied with water for irrigation, perhaps from the São Francisco, could be made into an especially productive land for tropical crops.

The agricultural part of the Northeast faces entirely different problems. There is no need to evacuate its population which, dense as it is when measured by Brazilian standards, is by no means too dense for the possibilities of effective support. If many of the inhabitants of the sugar region are apparently lazy, apathetic, and content with miserable conditions of life, this may well be due to prevailing illiteracy, bad hygiene,

and inadequate diet. Disease and malnutrition exact a heavy toll of the people of the Northeast; but these are conditions which have been recognized and will eventually be attacked. Many writers familiar with the Northeast insist that there is nothing eugenically wrong with the population, and that better sanitation and diet would counterbalance the enervating effects of the continuously warm and humid climate.

Meanwhile the Northeast continues, chiefly through its upper classes, to exert a strong influence on the rest of Brazil. The descendants of the planting aristocracy have contributed more than their share to the formulation of the political, artistic, and intellectual values of the Brazilian civilization. Unfortunately for the Northeast, these leaders are in increasing numbers drawn away from their homeland to take up residence in the capital city of Rio de Janeiro, where Brazilian life now finds its highest expression.

14

BRAZIL: THE SOUTHEAST

ON THE SHORE of Guanabara Bay in the southeast of Brazil there is a city which started as a defense post to guard a thinly populated sector of the Portuguese realm but which has grown in size and in the extent of its influence until today it has become the focus of everything Brazilian. The breath-taking beauty of the site on which this city has been built places it among the scenic wonders of the world. But not until the visitor stops to look beneath the things which first impress the eye is the full significance of this place revealed. For the city is not an exotic growth, like something which, cast up by the sea, has taken root on the shore: it is a product of all the vast extent of territory and all the varied activities of the people who occupy nearly half of the South American continent. There is a reflection, for those who understand, of every part of Brazilian life—of the boundless optimism of those who seek new speculative wealth on the frontier; of the deep hopelessness of those who live in poverty in the areas of decadence; of the gay sunshine of tropical coasts and the somber mysterious shadows of great forests; of the lost settlers of the sertão, those scattered, isolated victims of vast area; and of the great cities where the newest concepts of crowded urban living have come to Brazil from across the water. All these facets of Brazil are reflected in the city on Guanabara Bay—the city which is called Rio de Janeiro.

Rio de Janeiro, capital of Brazil, is more than just the urban nucleus of one of the zones of concentrated settlement. Today the city is far bigger

than the productivity of its immediate hinterland would justify. Yet the settlement of the Southeast gave Rio de Janeiro its start, and the roads of this region, and of the sertão beyond it, still lead to the shores of Guanabara Bay.

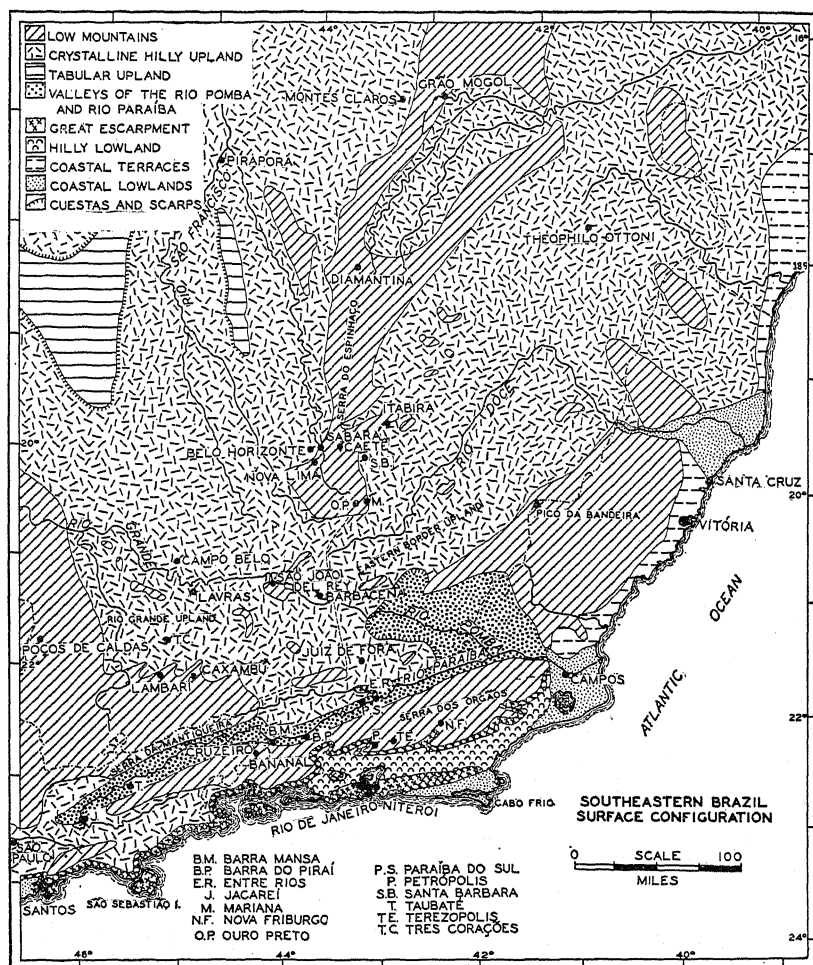
The zone of concentrated settlement, which we call the Southeast for want of a better regional name, is not a unit in the minds of the inhabitants. No such regional consciousness is found in this part of Brazil as is found in the Northeast. The people think of themselves as belonging to one of the several states: Rio de Janeiro State, Minas Gerais, or Espírito Santo (Map 78). Yet the states do not coincide exactly with the outlines of the areas of settlement (Map 90). The whole northern half of Minas Gerais lies in the sertão. The western part of Minas Gerais —the part known as the *Triangulo*—belongs to the area focusing on São Paulo city, and the eastern part of São Paulo State—the part known to the Brazilians as the *Norte*—lies within the hinterland of Rio de Janeiro.

Within the states or parts of states which are thus combined in a region of settlement, the variety of local contrasts is greater than in the Northeast. One of the outstanding characteristics of the Southeast is the intricate arrangement of its surface features, and the absence of any wide natural focus of lines of travel.

The population of the Southeast is scattered in small, isolated units, and is loosely attached to the land. The settlers who came to the region first in search of gold, remained to gain a living from agricultural and pastoral activities. But the story of the long process of readjustment since the decline of gold mining is a complex one. Again and again new speculative forms of land use have been introduced. Each time this has happened there has followed a period of hectic expansion accompanied by rapidly rising values and an influx of population, and then a period of sudden collapse, decadence, and abandonment. Always, at the end of each speculative cycle, the land has been returned to pastoral uses. The present pattern of scattered settlement, the multiplicity of small towns, the grass-covered terrain which was once forested, the spots of new and thriving development—none of these features in the Southeast can be understood without a knowledge of the cross-currents of settlement and resettlement which have moved back and forth across a stage so ill adapted for the play.

THE LAND

The physical background of the land is itself one of great diversity. The Southeast is made up of many little natural areas each more or less

distinct from the others. The intricacy is due chiefly to the surface configuration; the climatic conditions and the cover of vegetation, compared with those of the Northeast, exhibit wider zones of transition and fewer striking contrasts.

MAP 86

Surface Features

The surface features of the Southeast consist chiefly of a complex arrangement of crystalline hilly uplands and low mountains (Maps 6, 86, and 87). There are almost no large level areas except in the two deltas along the eastern coast—those of the Rio Doce and of the Rio

Paraíba. Small valley flats, terrace remnants, and isolated bits of high-level surfaces otherwise deeply dissected are scattered throughout the area. Only far in the interior are any remnants of the nearly level cover of sandstone strata to be found.

The mountains of the Southeast stand above the general surface of the crystalline hilly uplands. Most of these mountains are massive and rounded, owing their existence to beds of resistant quartzite or other types of crystalline rock which are less easily decomposed than the granites and gneisses. The highest peak in Brazil is the Pico da Bandeira (9,462 ft.), located on the border between the states of Minas Gerais and Espírito Santo (Map 87). Another relatively high range is the Serra dos Orgãos, just northeast of Guanabara Bay. High mountains also occur in the massive Serra da Mantiqueira, on the southwestern border of Minas Gerais, just north of the Paraíba Valley. Only in these three places, however, do mountains rise above the upper limit of trees, which in this part of Brazil is found between 6,200 and 6,500 feet above sea level. In the central part of Minas Gerais, the long, unbroken range known as the Serra do Espinhaço reaches elevations only of 5,500 or 6,000 feet.

Block mountains which are likewise not high enough to stand above the tree line form a belt of rugged terrain between the crystalline hilly uplands of the interior and the coast all the way southward from southern Baía. This is the Zone of the Escarpment which is crossed by two rivers rising in the hilly uplands of the interior,—the Rio Doce and the Rio Paraíba. The Rio Doce rises in eastern Minas Gerais, some of its head-water tributaries coming from the Serra do Espinhaço. It passes in a deep and flat-bottomed valley through the block mountains in the state of Espírito Santo. Through the valley of this river an approach of uniform gradient is offered all the way from the Atlantic to the eastern side of the Serra do Espinhaço—the only passage of its kind through the Zone of the Escarpment to the interior which is to be found between Salvador in Baía and Porto Alegre in Rio Grande do Sul.

The Rio Paraíba offers a much less satisfactory line of travel. Its valley is wide, with extensive floodplains and terraces, all the way from the big bend of the Paraíba, a short distance east of São Paulo city (Map 86) to Entre Rios, located almost due north of Rio de Janeiro. Between Entre Rios and the beginning of the delta above Campos, the Paraíba descends turbulently for about a thousand feet through a narrow rocky gorge. The wide middle part of the Paraíba Valley runs parallel to the coast, not into the interior, and it is bordered both to the north and to

SOUTHEASTERN BRAZIL
0
100
200 Miles
0
100
200 Kilometers
48°
46°
44°
42°
40°
20°
22°
Rio Paranaíba
Uberaba
Rio Grande
Rio São Francisco
Belo Horizonte
Itabira
Ouro Preto
SERRA DO ESPINHAÇO
Rio Doce
R. Doce
Vitória
PICO DA BANDEIRA
(800)
(500)
(1000)
Ribeirão Preto
(500)
Rio Pomba
Juiz de Fora
Paraíba R.
Campos
Paraíba R.
SERRA DA MANTIQUEIRA
PICO DE ITATIAIA
SERRA DOS ORGÃOS
Petrópolis
Niterói
Rio de Janeiro
Piracicaba
Campinas
Taubaté
Rio Tietê
Sorocaba
São Paulo
Santos
(600)
(2000)
Elevations in meters
Low mountains
Tableland of central Minas Gerais
Inner lowland of São Paulo
Diabase cuesta
Tableland of western São Paulo
Coastal lowlands
Coastal terraces
Crystalline plateaus
Raisz

MAP 87

the south by block mountains. A northern tributary to the Paraíba, the Rio Pomba, has excavated a wide amphitheater in the hilly uplands of southeastern Minas Gerais (Map 87), but the inner margin of this amphitheater is a steep and almost unbroken cliff, a thousand feet in height, which separates the Pomba basin from the highlands of the interior.

We can understand the difficulty of travel in the Southeast more clearly if we consider the profile of a route from the coast near Rio de Janeiro northward to the crystalline hilly upland of central Minas Gerais (Map 86). Along the immediate coast there is an outlying block mountain, separated from the front of the Great Escarpment by a zone of low country. A break in the coastal mountains permits the sea to come in through a narrow opening. This is the famous entrance to the bay on which Rio de Janeiro is located—an opening guarded by the typical knobby peak, the Sugar-Loaf, formed wherever in the rainy tropics crystalline mountains are exposed to the wash of waves at their base. Guanabara Bay, however, is bordered by mountains only at its entrance: most of the shores of the bay are low, swampy, and fringed with mangrove. The lowland, known as the *Baixada Fluminense*,[1] is not flat—it is composed of low rounded hills, shaped like half oranges.

The northern edge of the Baixada Fluminense is sharply terminated by the base of the Great Escarpment. East of Petropolis this escarpment is surmounted by the Serra dos Orgãos, and passes in this section are much higher than those farther to the west. In the vicinity of Petropolis the passes are between two and three thousand feet above the sea. In the northwest corner of the Baixada Fluminense, however, there is one pass which requires a climb of only 1,463 feet. From the crest of the Great Escarpment the descent to the Paraíba Valley—here a little over a thousand feet above sea level—is not difficult.

The Paraíba Valley offers an easy route of travel from the pass westward toward São Paulo; but for one who wishes to reach Minas Gerais the valley can only be considered a barrier. Beyond it, to the north, the ascent to the hilly upland, even if one travels to the east of the Serra da Mantiqueira, is by no means easy. The general level of the hilly upland in southern Minas Gerais is between 2,600 and 3,200 feet, with the higher elevations in the Rio Grande upland of the southwest.[2]

[1] Baixada is pronounced by-sháh-dah.

[2] The details of the surface features are even more intricate than the broader pattern. Throughout this part of Brazil the details of ridges and valleys are controlled by two major fault trends. The faults are not recent, for this is not a region of frequent earthquakes. But they have become zones of weakness

Climate and Vegetation

The climatic features of the Southeast have a rather surprising simplicity. The effects of altitude, to be sure, are reflected in the lower temperatures, and in a vertical change in the character of the vegetation on the higher mountains. The narrow coastal fringe has temperatures characteristic of most tropical east coasts. They are not excessively high at any time of the year, and, especially in winter, are often surprisingly low owing to the passage of cold air masses. High humidity, however, does increase the unpleasantness of the hotter part of the year, especially in places which are sheltered from the compensating effect of the wind. During the summer months the wealthier people of Rio de Janeiro seek the lower temperatures (nine degrees lower) and the more active social life of the community at Petropolis, on the crest of the Great Escarpment. The temperatures of the interior are lower than those of the coast, especially on the higher Rio Grande upland of southwestern Minas. Belo Horizonte, on the northwestern side of the Serra do Espinhaço, averages a little over 72° in its warmest month and about 62° in its coldest month.

The rainfall, too, has a relatively simple distribution over southeastern Brazil. On the slopes of the Great Escarpment, and on the sides of the mountains near the coast, rainfall of more than 80 inches is recorded in a number of scattered localities. Over most of the area, however, the amount remains with little variation between 40 and 60 inches. Throughout this area, also, the rainfall maximum comes during the summer months, and the cool season is relatively dry. Not until one reaches the northern and western side of the Serra do Espinhaço does he encounter a dry season of real moisture deficiency, for nearer the coast even the winter season has a considerable number of rainy days.

These climatic characteristics are reflected in the natural vegetation of the Southeast (Map 88). To reconstruct the actual details of the distribution is not always easy, for over much of the region the original cover has been entirely changed during the period of European settlement. The coastal zone, the front of the Great Escarpment, and no doubt some of the very rainy spots on the mountains farther inland were covered orig-

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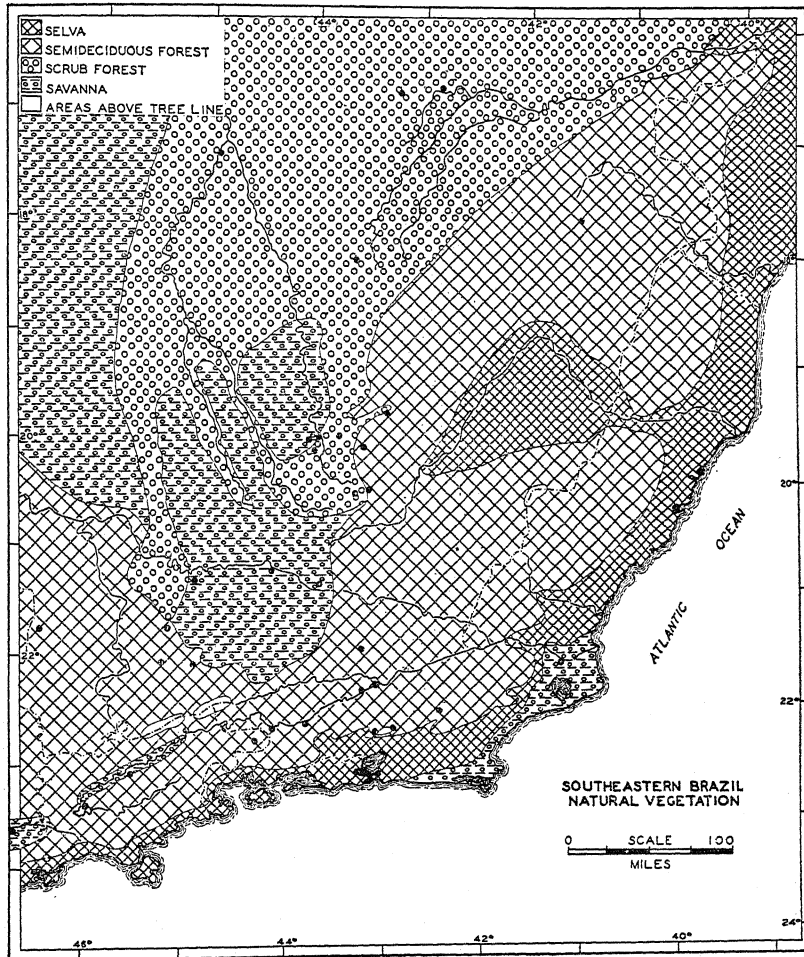
which are quickly excavated by the rivers. One system of faults runs from north-northeast to south-southwest; the other crosses the first, running from east-northeast to west-southwest. The excavation of valleys and scarps along these faults results in the formation of an exceedingly complex pattern of angular block mountains of rhombic shape. These two dominant trends appear not only in the minor landforms, but also in such major surface features as the Paraíba Valley, the Serra da Mantiqueira, the trend of the Great Escarpment, and even the trend of the coast on either side of Cabo Frio.

inally by a dense rain forest which proved to be a very considerable barrier to Portuguese penetration. The southern and eastern parts of the highlands were covered with a semideciduous forest which extended inland as far as the Serra do Espinhaço; and even today this forest covers large areas of the Rio Doce Valley and of the mountains of Espírito Santo. The

Map 88

Serra do Espinhaço itself as well as the São Francisco Basin to the west of it was covered, and still is, largely with scrub forest, except in the south where the use of wood for charcoal has practically destroyed the last vestiges of the original forest. The line between the scrub forest and the savanna is not at all sharp, but the line in southern and western

Minas Gerais, between semideciduous forest and savanna, was apparently a very distinct boundary—perhaps sharpened as a result of the common practice of burning the savanna. The savanna, covered with scattered thickets of scrub forest and threaded by galerias along the streams, extended southward almost to the Rio Paraíba, and apparently some of the floodplain of the Paraíba was covered with grass. The northern slopes of the Serra da Mantiqueira were grass-covered. In the southwestern part of Minas Gerais the forest boundary turned sharply northward, and forests covered the mountain slopes along the border between Minas and São Paulo as far north as the Rio Grande.[3]

COLONIAL SETTLEMENT

Such is the nature of the Southeast, a land in which a very important part of the story of Brazil has been enacted. This is the land with the heart of gold and the breast of iron; but it is a land not easy to penetrate, and not easy to move about in, for its surface and its forests are barriers to easy travel, and there is no natural focus of routes.

At first the highlands of the Southeast remained less well known than many more remote parts of Brazil. When Rio de Janeiro was finally established on its present site after the French had been dislodged in 1567, its function was that of a defense point, not that of a nucleus from which colonization of the interior was contemplated. In fact, a site was selected on the shores of Guanabara Bay which was difficult to reach from the interior, in order that the fortress might have additional protection from possible attack.

The first exploring party to reach the highlands ascended by the easiest possible route—not from Rio de Janeiro, but through the valley of the Rio Doce from Vitória farther east. This great natural highway to the interior might have played a very different role in the course of settlement had it not been occupied by a group of exceptionally warlike Indians—the Botocudos (Map 4). These savage tribes resisted the white men, and, like the Araucanians of Chile, took advantage of the white man's lack of knowledge of the forest to retard the advance of the Portuguese. Although the coast of Espírito Santo and southern Baía was colonized

[3] The Portuguese terms for these vegetation types are:

Forest in general	*mata*
Rain forest	*selva*
Scrub forest	*caatinga*
Savanna	
with scattered trees	*campo cerrado*
without trees	*campo limpo*

very early, the only settlements which survived the attacks of Indians were Vitória, on an island, and Ilheus, on a site which could easily be defended from the interior. Most of the coast between Campos and Salvador was abandoned, and even today this section of Brazil remains a great empty space on the population map (Map 90), and the Rio Doce has not developed into an important line of travel to the interior.

It was not until 1698 that Minas Gerais became important. In that year bandeirantes from São Paulo discovered gold in the stream gravels of the southern part of the Serra do Espinhaço. Until that time, however, they, like the rest of the Portuguese, generally neglected Minas. The chief routes into the interior ran northward from Itu and southward from Sorocaba. People from São Paulo had also pushed northeastward into the upper part of the Paraíba Valley, where Taubaté became the chief town.

The Gold Period

The gold which was the chief cause of the rapid settlement of the Southeast after 1698 was found at many scattered localities throughout Minas Gerais, but chiefly in the central area around the southern part of the Serra do Espinhaço. Although there are veins of precious metal in the rocks of this range, the mining of the eighteenth century was entirely in the stream gravels. Many towns were established near the places where mining proved to be especially profitable. One of the most important of these towns—the place which soon became the political center of this part of Brazil—was Villa Rica (now known as Ouro Preto). Other major mining centers included Mariana, Sabará, and São João del Rey (Map 86). After the discovery of diamonds in 1729 near Tijuco (now known as Diamantina) there was a rush of new settlers still farther toward the north.

The people who poured into Minas Gerais came chiefly from three places. A large number were new immigrants from Portugal, mostly not men of means but adventurers seeking a quick road to wealth. Many Paulistas entered Minas also, and during the early years of the eighteenth century they even fought for the political control of the territory. The Paulistas were defeated, but their numbers continued to swell the ranks of the gold seekers. There were also considerable numbers of former plantation owners from the Northeast, especially Baía, who, with their slaves, moved into the new zone of exploitation. Villa Rica supplanted Salvador as a place of great wealth; gold supplanted sugar.

can be understood more clearly when they are compared with a map of forests than when compared with a map of slopes. In starting northward from Rio de Janeiro, the necessity of cutting and maintaining a road across the Baixada Fluminense was avoided by transporting goods across the bay and up the small, mangrove-fringed streams as far as the shallow-draught boats could be floated. From the river landings the shortest route to the base of the Great Escarpment was taken. Since mules did the work of carrying, the height and steepness of the climb meant less than the directness of the road: consequently the low pass from the northwest corner of the lowland, which was relatively distant from Guanabara Bay and off the most direct route to Minas, was never utilized as an important line of travel until railroad engineers in the nineteenth century became interested in finding easy grades over the mountains. The chief passes of the colonial period were all more than two thousand feet in elevation; the main road to Minas passed the site which was used later for the resort town of Petropolis.

The crossing of the Paraíba was near Paraíba do Sul (PS on Map 86), which became one of the larger towns of the valley. Beyond this, the road climbed onto the highlands by the most direct route. It led by way of Barbacena to Villa Rica, with a branch from Barbacena to São João del Rey.

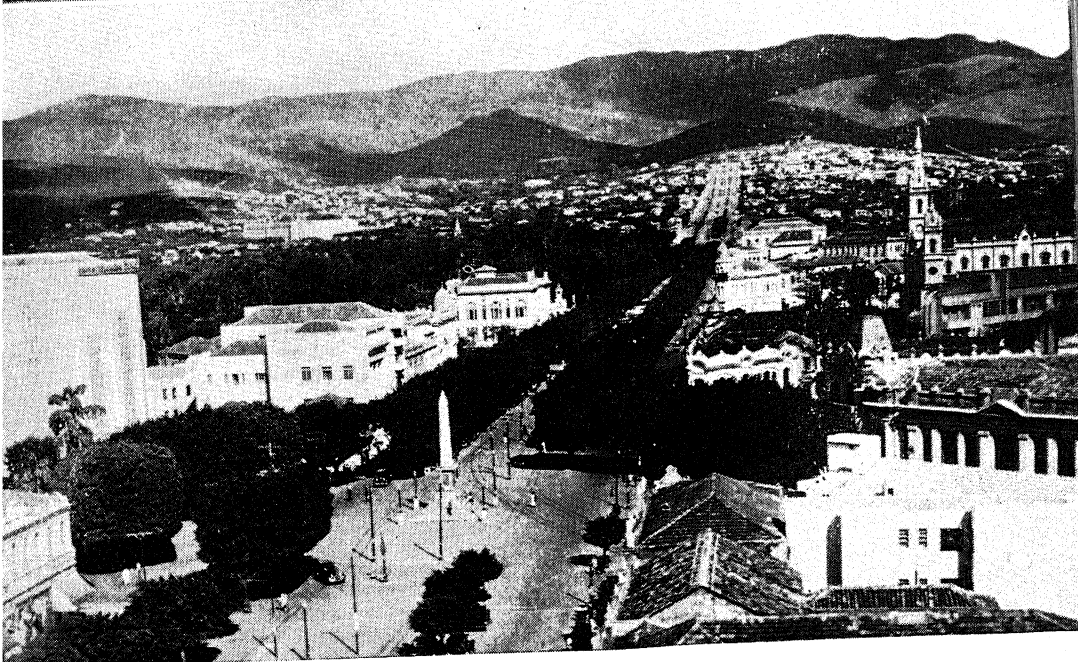
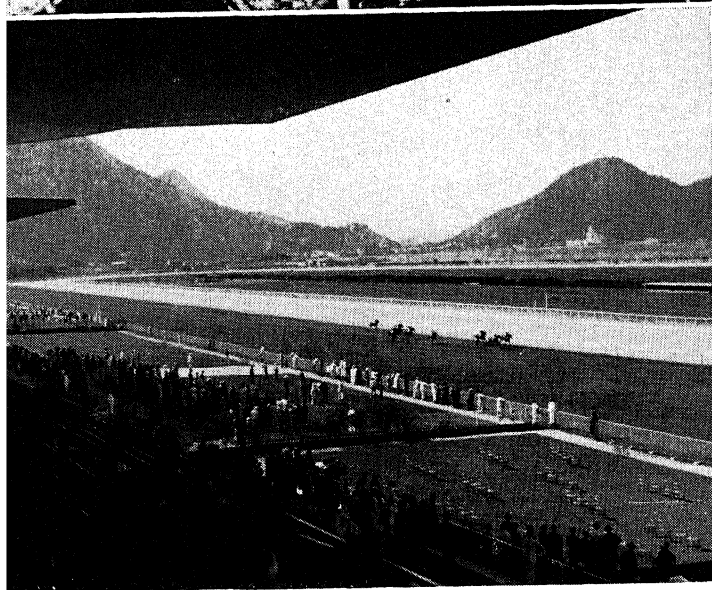
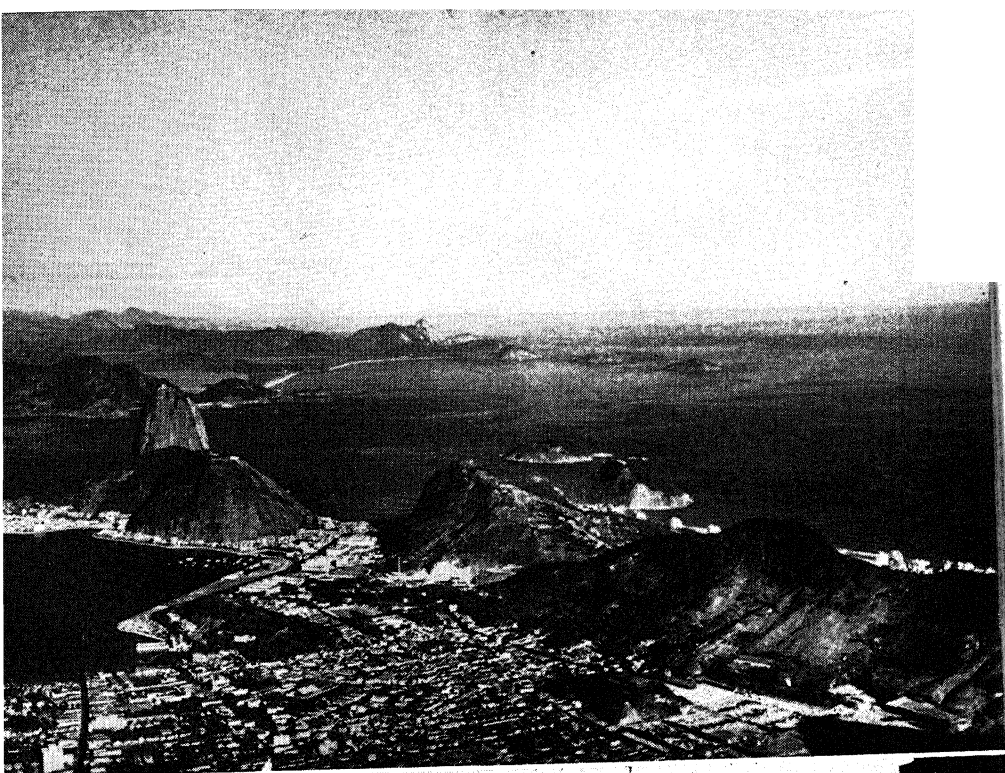
In addition to this main axis of penetration, roads were also built in other directions from Rio de Janeiro. One led to Campos, on the delta of the Paraíba, where cattle were pastured on the open savannas along the coast (Map 88). A more important road, however, led directly from the port of Rio de Janeiro to São Paulo. It also neglected the low pass over the Great Escarpment, ascending and descending several ridges to follow the more direct route by way of Bananal to the Paraíba Valley, and thence to São Paulo. Beyond the big bend of the Paraíba a steep climb from this valley into the São Paulo Basin was necessary. Over these two roads an important part of the meat supply for the people of Rio de Janeiro was driven—some of the animals coming all the way from the prairies of the southern states. All three roads out of Rio de Janeiro became the important axes of settlement of the Southeast; and the places where side roads branched off from the main ones, or where the roads crossed through passes or over rivers, were the places where the first commercial towns were planted. Although these old roads no longer exist, pieces of them are in a sense preserved in the main streets of the little towns.

Villa Rica was a thriving center of more than 60,000 people during the

gold period. Although it took two weeks or so to reach it on horseback or muleback from Rio de Janeiro, the large amount of wealth concentrated in the hands of those whose luck had been good resulted in the creation of much luxury and splendor in this center. Many churches and many palatial homes were built. These were decorated with some very fine examples of colonial carving and painting. Only in the last few years has the Brazilian government recognized the historical value of these old churches and buildings and created a service for their preservation. Ouro Preto today is a national monument, filled with the relics of that amazing period (177).

Decadence

The gold fever lasted for about a century. All through the interior, stream gravels and hillsides which were found to contain gold were worked over by placer methods. Even today there are many spots which remain desolate wastes, miniature, man-made badlands, where the earth was torn and furrowed in the frantic search for the precious metal, and then abandoned. But between 1800 and 1830 there was a rapid decline in gold seeking. The richer placer deposits had been worked over, and other parts of the world were producing gold at lower cost. Except for certain vein-mining enterprises, to be described later, and except for sporadic attempts to rework the old deposits, gold mining in southern Minas Gerais was at an end.

The people, whose sole means of support had been mining, were forced to find another basis for existence, or to move away. They did both. During the first third of the nineteenth century, there was a large emigration from Minas Gerais. It is impossible to estimate the number of people actually involved, but the results of this movement may be observed in the present character and distribution of people throughout the neighboring regions. A great many Mineiros (people of Minas Gerais) returned to the Paraíba Valley in São Paulo State, where, at that time, the planting of coffee was just entering the period of speculative expansion. Many of the planters who established themselves, in the middle of the nineteenth century, around Ribeirão Preto (Map 91) were formerly proprietors of gold mines in Minas. Most of those who went to São Paulo carried with them a considerable capital won from the gold fields. The poorer people who possessed a sufficient love of the unknown, headed northward and northwestward into the sertões. People from the mining districts were chiefly responsible for the thinly scattered pastoral settle-

The upper picture shows the hilly terrain above the city of Ponte Nova on the Rio Doce in Minas Gerais (see Map 86). These hills were once heavily forested, but now are mostly grass-covered and are used for pasture. Division lines between properties in this section are generally the crests of ridges. Ditches rather than fences keep livestock from straying. (Photo by S. H. Holland.) A view of the new capital city of Minas Gerais — Belo Horizonte — is given in ... (Courtesy of the Brazilian Government Trade Bureau.)

The panoramic view above shows Rio de Janeiro as seen from the top of Corcovado Peak. At the right is the famous Sugar Loaf guarding the entrance to Guanabara Bay. Near the left-hand margin is the commercial center of Rio with the new airport just beyond. Opposite the commercial center, on the other side of the bay, is Niteroi, capital of the state of Rio de Janeiro. Botafogo Bay is in the center foreground. Over the top of the hill near the right-hand margin the new buildings on Copacabana Beach are just visible. (Courtesy of Pan

of the Furness Line.) The center picture is of the Praça Floriano, at one end of the Avenida Rio Branco. The prominent building is the Monroe Palace, used before 1930 as the senate chamber. The buildings at the right are large movie theaters. The mosaic sidewalk, common in most of Brazil's cities, is a Moorish inheritance coming through Portugal. (Courtesy of Moore-McCormack Lines.) The picture at the right is of a street in the older part of Rio de Janeiro. In the background is a public market. (Courtesy of the Furness Line.)

The picture at the upper left is of a street in Ouro Preto, former rich gold-mining center and capital of Minas Gerais. The school children are dressed in the standard uniform used throughout the country. (Photo by Eric Hess.) The picture at the upper right is a typical scene in one of the small towns of southwestern Minas Gerais. The bus runs over poor roads to connect with a railroad in a neighboring town. The lower picture shows one of the chief items of shipment in this part of Brazil — charcoal. It is used as a fuel for heating and cooking, and even in small industrial plants. (Photos by the author.)

ment of the whole southern part of the São Francisco Basin, and for the movement of pastoralists on westward into Goiaz.

These movements of emigration had a profound effect on the character of those who remained in Minas Gerais. The more successful people moved on into São Paulo, attracted by the opportunities for quick wealth on the coffee frontier; the more adventuresome people moved out into the sertões; those who remained were, in general, those who had been less successful and who lacked the peculiar quality of mind that leads some men to seek the unknown. If today the inhabitants of rural Minas seem to remain apathetic in the face of innovations and improvements, perhaps the process of selection which went on after the gold period may in part account for it.

During the last hundred years the history of the Southeast has been punctuated by repeated attempts to re-establish some basis of speculative profit. Most of these endeavors proved for a time, and in certain localities, to be successful. But one after another the speculative cycles of sugar and coffee ran through the period of maximum development and then rapidly declined. The more recent cycles of rice and orange cultivation are still in process of development. But the stabilized and fundamental support for the people of Minas remains the grazing of cattle for meat and dairying. Before turning to a discussion of these agricultural cycles and of the pastoral base, we must examine certain elements of the pattern of settlement.

PATTERN OF SETTLEMENT IN THE SOUTHEAST

The present pattern of settlement in the Southeast is the result of processes continued over more than two centuries. The period of gold prosperity saw people spread widely over the central and southern part of Minas Gerais. New boom towns grew up near the rich gold-bearing gravels, and these survived as small agricultural centers after the period of mining came to an end. Each cycle of agricultural development brought a new arrangement of people on the land. Each boom development brought a wave of settlers to those places which were physically suited to the new crop, which were sufficiently accessible, and which were occupied by landowners ready and able to make the necessary investment in equipment. New types of mining activities and the development of industries in some of the cities led to other concentrations of people. The pattern of settlement remains notably unstable, with only a loose attachment of people to place.

The rural population of the Southeast is fairly dense. In southern Minas Gerais and the neighboring parts of São Paulo and Rio de Janeiro the rural density is not much less than 100 per square mile, and in central Minas it is between 25 and 60. Yet one who travels by rail through this region gains the distinct impression that the land is thinly populated: one passes through great distances of apparently empty country, used only for pasture.

The Fazenda Mineira

One reason for this impression of low population density is the arrangement of people on the typical large estate of Minas Gerais—the *fazenda mineira*. In many respects this traditional form of rural settlement is similar to the sugar fazendas of the Northeast. The tenants are widely dispersed over the countryside in isolated homes, as much hidden from the homes of their neighbors as possible. The boundary lines which separate one large estate from another are commonly drawn along the ridge crests or stream divides, leaving each little valley as the undivided property of one owner. Where the crops are concentrated in the valleys, as in the Northeast, this arrangement is quite satisfactory; but it seems ill advised in a hilly country like Minas, where the agricultural lands—at least those devoted to tree crops like coffee—are restricted to the hillsides. Where roads and railroads follow the undissected remnants of the upland surface, as is the case in many parts of southeastern Minas, the estate buildings, and the scattered tenant homes in the valleys are all hidden from the traveler who does not depart from the main routes.

Not all the rural workers of Minas Gerais, however, are dispersed in single-family homes over the countryside. A very large proportion of the rural people are gathered together in rural villages. It is a custom of long standing for the large landowners to make gifts of small sections of their estates to the church. The express purpose of such a gift is to establish a town, dedicated generally to a saint and administered under the direction of the church. While there is a certain religious prestige to be gained by such a grant, it is obvious that economic profit will also accrue, if only because of the supply of workers gathered together in the neighborhood. When crops are to be cultivated as a part of the process of replacing worn-out pastures with new pastures, or when other jobs need to be done, here is a reserve of laborers ready to be called on. When one landowner has established a *patrimonio*, as such grants are called, it frequently follows that other landowners, not to be outdone, set up other

patrimonios not far away (148). Many of the rural workers of Minas are now grouped in these small, scattered villages.

The appearance of the small rural villages, which are extraordinarily numerous throughout this part of Brazil, is not very pleasing. The center is invariably a small church, facing a bit of open ground known as the *praça* (the Portuguese equivalent of the Spanish *plaza*). The village praça, however, is usually only a grassy space, crossed by paths worn by the unregulated going and coming of the inhabitants. The houses are huddled together around the margins of the praça, or perhaps, in the larger villages, are strung out along the roads which converge on the church. In either case, the houses are built as close together as possible, as if their owners were fearful of the vast empty spaces beyond. The buildings are comfortless structures of "daub and wattle"—that is, of mud daubed on a framework of poles—with mud floors and leaky tile roofs. The passage of the years is marked by many unrepaired cracks and openings both in walls and roof. The people who live in these camp-like, unhygienic structures, and who do so little to improve their conditions of living even within their homes, cannot be expected to form any very close attachment to the land. The question may be raised, but not easily answered, whether this prevalent attitude toward the rural home and the rural life is a cause or a result of the instability of settlement.

That so many people live either in complete isolation on the fazendas or in these small scattered village communities is one of the fatal weaknesses of settlement in this part of Brazil. Where a population is so widely disseminated in small groups, great difficulty is found in covering the costs of building and maintaining roads, schools, or the many other services and institutions which contribute to the establishment of a civilized way of living. Illiteracy, poor hygiene, primitive methods of agriculture, lack of material comforts in the home—all are partly the result of isolation; and the isolation is in part the result of this scattering of the rural people in groups which are too small.

Railroad Lines

Another reason for the impression which a traveler in the Southeast gains of a relatively sparse population, is the fundamental lack of integration between the railroad system and the pattern of settlement. The Southeast is served by one of Brazil's two chief railroad nets. Yet a close examination of the relation between the railroad lines and the centers of population reveals a notable lack of adjustment, and throws additional light on one of the basic symptoms of instability.

Railroad development in the Southeast began near Rio de Janeiro and spread inland. The first railroad in Brazil was built in 1853 to connect one of the small landing places on the northern side of Guanabara Bay with the base of the Great Escarpment. Soon after this, another railroad was built across the lowland from Rio de Janeiro to the base of the escarpment near the only low pass. This became the first section of the government-owned railroad, known as the *Central do Brasil*. The main line of the Central now makes use of the low pass over the Great Escarpment and reaches the Paraíba Valley at Barra do Piraí (Map 89). The main line then turns eastward to Entre Rios before starting the difficult ascent into Minas Gerais. It passes through Juiz de Fora, Barbacena, and Belo Horizonte. A long projection from Belo Horizonte extends northward into the sertão to reach the head of navigation on the Rio São Francisco at Pirapora. A branch of the Central runs up the Paraíba Valley from Barra do Piraí to the great bend of the Paraíba, where it climbs steeply to the São Paulo Basin and reaches São Paulo city. On either side of the main line of the Central, other railroads cover southeastern and southwestern Minas Gerais (Map 97).

Most of these railroads, from a North American or European point of view, do not constitute efficient, modern means of transportation. The main line of the Central to Belo Horizonte and the branch to São Paulo are built on a broad gauge of five feet six inches; but the other lines are all on a one-meter gauge. Most of them are single-track lines, cheaply constructed, and poorly maintained. In order to reduce to a minimum the heavy cost of building cuts, fills, bridges, and tunnels the lines wind about over the slopes with only a very few sections of straight track and with many steep grades. The wood-burning locomotives struggle painfully up the hills, or clatter noisily down the declines accompanied by clouds of dust and showers of sparks. These railroads serve a region which, for the most part, has only small quantities of goods to ship in or out. They both reflect this state of affairs and contribute to its continuation. Their rates are so high that some potential traffic is sent by other means of conveyance; yet these rates are necessary to cover the high cost of maintenance where traffic is so light. When the trains stop at a station, the traveler is able to hear the "music" of rural Minas—the shrill, discordant squeak of the ungreased axles of oxcarts which still carry a considerable proportion of the goods transported in the interior. There has not been in the Southeast such a happy co-ordination of railroad building and wheat farming as that which made the fortunes of so many people in the Argentine Humid Pampa.

Railroads and Towns

The lack of integration between the railroad system and the pattern of settlement in Southeast Brazil becomes more apparent when we consider the location of towns with reference to the railroads. Many of the towns were first established with reference to the colonial roads—either at river crossings, or road junctions, or at the ends of passes, or at other points of special significance on roads built for horses, mules, and oxen. Since the railroads generally cannot follow these old routes very closely because they cannot negotiate grades which are so steep, the main railroad junctions are in many instances remote from the road junctions. Changes in the pattern of settlement resulting from the construction of railroads may be observed in many parts of the Occidental world—old towns remote from the new lines of circulation declining in population in favor of new towns which spring up along the railroads; the formation of double towns, a railroad town to serve a near-by road town; or, in many cases, the extension of the older towns to form a continuous built up connection with the new means of transportation. But in Brazil these transformations are taking place slowly. Most of the old towns have maintained their importance, even when they are reached only by branch lines of the railroads, or by no railroads at all. Many are the important rail junctions at which urban development is either small or even entirely lacking. Many are the stations along the main lines where automobile busses gather to meet the trains and to carry passengers over poor roads to large towns located perhaps a mile, perhaps five or ten miles away. And still the commonest means of shipping goods is by the slow oxcart.

Railroads, we may surmise, do not play a very large part in the economic life of the region—as large a part as the railroads of North America or of Europe play in the economic life of those continents. One sign of this lack of integration is the prevalence of small-scale manufacturing establishments. Rates of transportation are so high that relatively inefficient plants can sell to local markets from which the goods manufactured at lower cost elsewhere are excluded. In this region the economist can study at the present day an economic life which has passed into the realm of history in most parts of western Europe.

Nevertheless, the inevitable transformation of the pattern of settlement and of the economic system in the Southeast has made a start. In the Paraíba Valley, upstream from Entre Rios, most of the older towns originally established along the colonial roads at points where river crossings

were easy, have also been reached by the railroad. In recent years many new industrial plants have been built to serve more than a local market. The first hydroelectric plant in Brazil was built in 1889 in Juiz de Fora, which has since become an important manufacturing center. Several mining communities in the Serra do Espinhaço also make use of the rail connections, and steel manufacturing plants at Caeté and Sabará are dependent on the rail lines not only for the shipment of their product, but also for the supplies of charcoal which keep them running. Similarly, in the southwest of Minas Gerais, on the northern slopes of the Serra da Mantiqueira, there are several communities where rail connections are essential for the economic life: these are resort towns where mineral springs and cooler air attract the well-to-do people of Rio de Janeiro and São Paulo for vacation and rest—such places as Caxambú, Lambarí, and Poços de Caldas (Map 86). These few places, which for one reason or another are closely integrated to the railroad system, stand in striking contrast to the prevailing lack of such integration in most parts of the Southeast.

Belo Horizonte and Ouro Preto

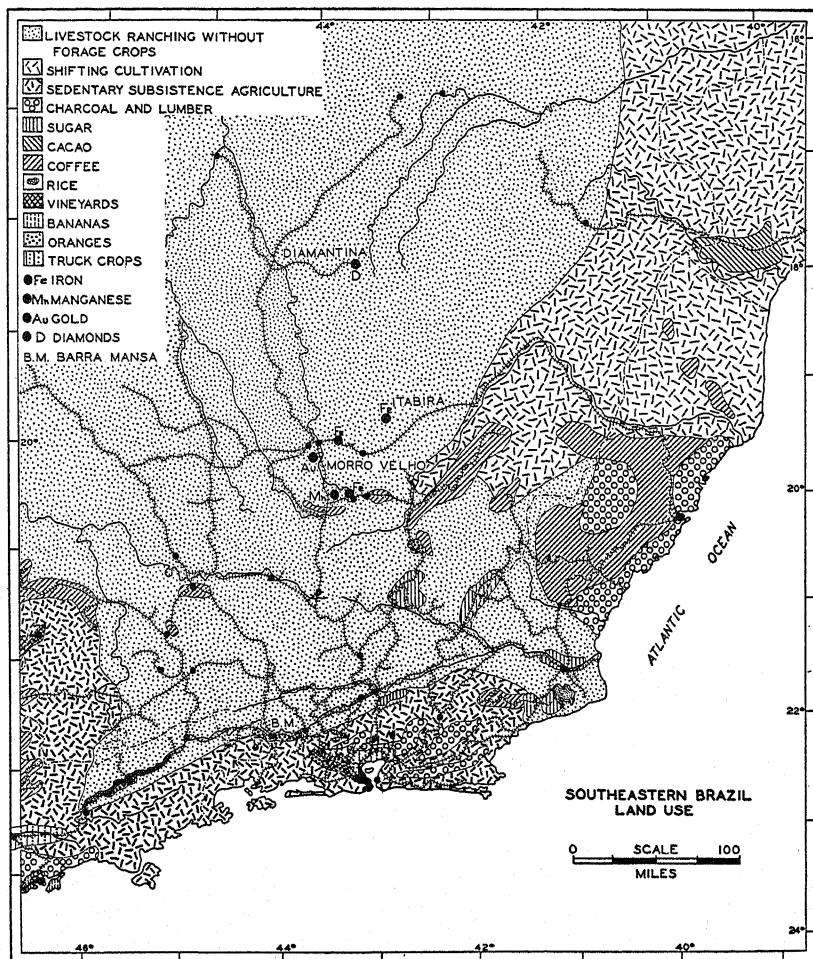
The transformation of the settlement pattern in the interior of the Southeast has appeared in no more striking form than in the transfer of the state capital of Minas Gerais from the old colonial town of Ouro Preto to the entirely new city of Belo Horizonte (177). Ouro Preto is a typical Portuguese town. Its unplanned, narrow, winding streets of irregular width are flanked by buildings built close together. It lies sprawled across the slopes of a narrow mountain valley in the midst of the Serra do Espinhaço, on a site so hilly that not only was the railroad unable to reach it, but also any expansion and modernization of the city was next to impossible. In 1896 the political center of the state was moved to a new place where a city had been planned with wide streets and a pattern similar to that of Washington, D. C. Ouro Preto is rich in historical tradition, an art center with fourteen churches which are fine examples of colonial architecture, and which contain important paintings and sculptures. But today Ouro Preto is occupied by fewer than 10,000 people, who live surrounded by the empty shell of buildings which once housed more than 60,000. Belo Horizonte, on the contrary, occupies a site on the northern side of the mountains where a wide sweep of the highland offers ample space for expansion. New government buildings, new residences, new industrial plants give this city an atmosphere entirely

different from that of the traditional Brazilian cities. The new capital has grown rapidly; in 1920 there were some 55,000 people in it, in 1929, 109,000, and in 1938 it had a population of 208,000. This city is more modern in its planning and in some of its architecture than are most of the cities of North America.

The new site chosen for the political center of Minas Gerais was selected with scant attention to the geographic realities. To be sure, it is located not far from the center of the state; but it is not only remote from the center of the inhabited part of the state, but it is separated from that part by the Serra do Espinhaço (Map 90). Most of the people of Minas Gerais live east and south of this mountain range, whereas Belo Horizonte, located north and west of the barrier, stands almost literally on the margin of the sertão.

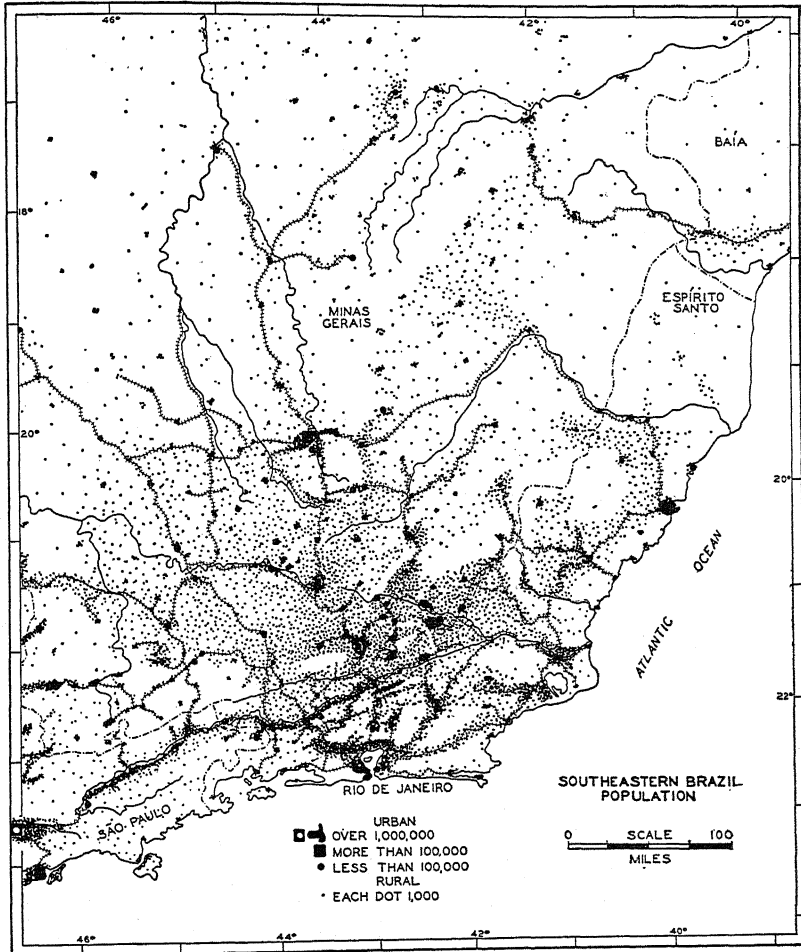
LAND USE IN THE SOUTHEAST

The present patterns of land use in the Southeast, like those of population and lines of circulation, are the result of several cycles of speculative growth and subsequent collapse. The basic form of land use is pastoral, and this has provided the one permanent economic support for the settlement of the Southeast since the end of the gold period. Meanwhile, however, a succession of agricultural cycles has appeared. Each cycle is initiated by the rapid spread of commercial planting in one locality—usually a locality which has the advantage of accessibility to a market or a port. Quickly the opportunity for profits is seized by the people of other localities and the new form of land use is expanded far beyond the limits of the area where the cycle originated. Increased competition from new plantings and decreased yields in the older plantings result in a decline in the original area, and in some cases even in the movement of settlers away from it. Sugar cane was the crop of the first of these cycles, spreading from centers about Rio de Janeiro and Campos. The coffee cycle began in the Paraíba Valley and spread both into other parts of the Southeast and also westward into São Paulo State. More recently the Paraíba Valley has been the scene of boom developments in commercial rice production, and in the planting of oranges. The strategic location of the Paraíba Valley between Barra do Piraí and Jacareí, forming the main line of travel between Rio de Janeiro and São Paulo, together with the suitability of the floodplain and terraces for a variety of crops, has made possible the development of several of the agricultural cycles in this nuclear area. In the valley, a relatively dense population was al-

ready gathered before the start of the gold period, and during the gold period much of the food consumed in Minas Gerais came from this region. With the decline of mining activities many of the Mineiros had returned to the Paraíba Valley. An ample supply of cheap labor was

Map 89

therefore available in a region which had all the advantages of easy accessibility to rapidly expanding markets. Now, the first signs of jute planting have appeared—perhaps initiating still another speculative cycle; and in this valley the Brazilians are now planning the construction of a large-scale steel plant. The Paraíba Valley has played the role of nuclear area in the economic history not only of the Southeast but also of São Paulo.

The Sugar Cycle

The earliest of the speculative cycles to develop in the Southeast was the cultivation of sugar cane. Sugar was not a new crop in this part of Brazil, for it had been grown since early colonial times in the lower areas

MAP 90

along the coast. Wealthy sugar growers owned plantations around the outskirts of colonial Rio de Janeiro, and the name engenho is preserved in many of the sections of the city—for example, Engenho Novo, one of the northern suburbs. By the end of the sugar period there was a considerable amount of production coming from large plantations around

Rio de Janeiro and Campos. According to figures given by João Antonil in 1711, the state of Rio de Janeiro in that year produced almost as much sugar as the state of Pernambuco.

For a time the new gold fever retarded the expansion of cane plantations. With the decline of gold mining many of the owners of large estates in the interior turned to the production of sugar cane. Especially in the valley of the Rio Pomba in southeastern Minas Gerais, sugar cane became a crop of major importance. The higher parts of the upland which were too cool did not share in this cycle, but most of the lower valleys, even in the mountainous sections, were utilized for cane.

Several factors contributed to the decline of sugar planting in the Southeast. One was perhaps the large and growing market for beef in Rio de Janeiro, which, with the transportation facilities available, had to be supplied from near-by sources in order to satisfy the Brazilian preference for freshly killed meat. Another was the impoverishment of the soils, after years of hard use, especially the light soils of the Paraíba Delta. Still another reason, according to Deffontaines, was the almost complete deforestation, for the production of sugar or alcohol requires a plentiful supply of cheap fuel (174). At the present time, sugar production in the Southeast has been greatly reduced in the face of the booming sugar district of São Paulo State. The landowners have turned their cane fields back into cattle pastures; a large number of people formerly employed in the cane fields have emigrated to other parts of Brazil. Only on the southern part of the Paraíba Delta and in the Pomba Valley are small areas still devoted to sugar cane.

The Coffee Cycle

Coffee was the second crop to achieve such importance in the Southeast that it attracted new settlement, and drew people away from the other parts of the country. The coffee plant had been grown around Rio de Janeiro and in the Paraíba Valley since about 1774, but its value as a commercial crop came only with the rise of a market for coffee in the cities of Europe and North America in the early nineteenth century. The first area of rapid expansion of coffee planting was in the Paraíba Valley, especially on the higher terraces and lower mountain slopes of the southern side of the valley whence the product could easily be sent out over the road to Rio de Janeiro. People came from various parts of Brazil to swell the current of migration to this new region of prosperity, and many were those who moved into the Paraíba Valley from the decadent gold-mining towns of interior Minas Gerais. The peak of production in the

Paraíba Valley was reached soon after the middle of the century. From about 1860 down to the present, the coffee plantations of the Paraíba Valley have continued to decline, and are now almost entirely gone. There never had been much care of the trees or the land, and the wasteful method of planting coffee in vertical rows only on the slopes—which agricultural specialists do not advise—resulted in a gradual decline of yields. The competition with better favored areas in São Paulo State sealed the doom of the coffee fazendas of the Paraíba Valley. More and more of the area was utilized for pasture.

Coffee was planted widely over the southern part of Minas Gerais, especially the southeastern part, as well as in the Paraíba Valley. After the freeing of the slaves in 1888, for a decade the state government attempted to bring in agricultural immigrants by offering subsidies of various kinds, as was being done with much success in neighboring São Paulo, but the conditions of life on the fazendas of Minas, especially the low wages, and the fact that the tenants were located in scattered and isolated homes, did not appeal to the prospective immigrants. In spite of the effort, therefore, the main current of European immigration never affected Minas Gerais significantly. The coffee plantings, whether because of inadequate care, or because of poor soils, or both, little by little declined in yield and were abandoned. The life of the plantations was extended perhaps longer than might otherwise have been the case by various schemes introduced by the growers of São Paulo to maintain the price of coffee. Today a small amount of coffee still filters out from eastern Minas Gerais and from the bordering mountain districts of Espírito Santo and Rio de Janeiro. The greater part of the land, however, has been returned to grass pasture for the grazing of herds of cattle.

It was the shipment of coffee to Rio de Janeiro that stimulated the first railroad construction in Brazil. In 1873 the tracks of the Central cleared the barrier of the Great Escarpment. By 1875 the main line had been extended to Juiz de Fora in southern Minas, where there was considerable activity in coffee planting; and by 1877 the branch line was built along the Paraíba Valley to São Paulo city. But by that time it was too late; the coffee plantations of the Paraíba Valley were already on the decline, and coffee production was moving elsewhere.

The Rice Cycle

The development of a specialized rice district in the middle Paraíba Valley marks the appearance of still another agricultural cycle. Rice is one of the major items of diet of the Brazilian people, and is widely grown

as a subsistence crop for local use. It would have been strange indeed if a district of specialized rice production had not appeared to supply the large and growing urban populations of Rio de Janeiro and São Paulo. As it happens, there is a section of the Paraíba Valley which is physically well suited to this crop and which borders the branch of the Central running between the two metropolises.

The middle part of the Paraíba Valley, from the big bend of the river not far from São Paulo city to the beginning of its gorge east of Entre Rios, remains broad and open between the bordering ranges of mountains (Map 86). Its bottom, however, is not entirely flat. On either side it is lined with a series of terraces, somewhat dissected by tributaries to the Paraíba which in places have cut the loose terrace gravels into very rough and hilly terrain. At intervals the terraces, which stand some 50 to 100 feet above the river, advance toward the center of the valley, carried on the shoulders of buried ridges of solid rock. In these places the river flows over small rapids, bordered by high terraces on either side. Upstream from each of these narrows, the terraces retreat, leaving a wide zone of swampy floodplain through which the river meanders. The floodplain at these wide points is between five and ten miles across.

The first settlement of the Paraíba Valley avoided the floodplain, and even the flatter parts of the terraces. Brazilians have always preferred the hilly locations on which to plant tree crops. The coffee plantations, therefore, were mostly back from the center of the valley. But the little towns which were strung along the road between Rio de Janeiro and São Paulo were commonly located near the narrow places, where the valley could be crossed without entering the floodplain swamps. Three of the larger towns were connected directly southward by mule trails to little ports along the coast, and actually found these outlets cheaper than the longer route to Rio de Janeiro. With the decline of coffee, the Paraíba Valley also declined in population; and the coming of the railroad cut off the little remaining activity at the ports.

The use of the floodplain for the cultivation of rice on a commercial scale began in the period between 1918 and 1920. Much earlier a bit of swampy land near Taubaté had been cleared and used for rice with excellent results, but the product was consumed only locally. In 1918, however, high prices for rice in São Paulo and in Rio de Janeiro, together with the enterprise of some immigrants who came to the valley through São Paulo, resulted in a boom period of speculative development. Land values began to soar as more and more of the floodplain area was cleared and planted. The fortunate owners became wealthy; in a few years most

of them had departed to share in the delights of life in São Paulo or Rio de Janeiro, leaving their estates in the hands of tenants, who also for a time were able to make good incomes both for themselves and for the owners.

Several features of this district of concentrated rice production serve to illustrate the fundamentally exploitive character of Brazilian land use. In the first place, the most important factor governing the selection of land on which to grow rice has been accessibility to the railroad. In a zone along the southern side of the floodplain, the rice fields are almost continuous, and, here, are close to the line of the Central which follows the edge of the southern terrace. Varying physical qualities of the floodplain soil or of the supply of water are disregarded—in other words, there is no sign of close adjustment of the patterns of land use to the varying character of the land. Then, too, there is no attempt to control the supply of water beyond a minimum of drainage ditches. The somewhat irregular natural floods of the Paraíba are used to cover the growing rice; if the flood fails, the rice is not covered; if the flood is too high, the rice cannot be harvested. There is no reservoir upstream, no public diversion canal, none of the hydraulic works one expects to find in a district specializing in the production of rice. We have heard so much of the intensive methods of the Oriental rice growers that we forget that rice can be grown also with very much less work. Of course the yields per acre are low. In the rice district there are fewer than 100 rural people per square mile; and there is no reason to suppose that they are more permanently established than were the coffee growers before them. In fact, a new boom crop has now appeared. This new crop will not occupy the floodplain of the Paraíba where rice is grown, but it may induce some of the rice growers to seek the greater profits of the new enterprise. The new crop which is sweeping the Southeast is the orange.

The Orange Cycle

New plantations of oranges have appeared suddenly during the last five years. On the sides of the hills in the lowland near Rio de Janeiro, orange trees planted in vertical rows have now replaced the bare grassy slopes terraced by the feet of grazing animals. On the hills which border the line of the Central in its course through the Paraíba Valley, orange plantations are appearing where once there was coffee. Oranges are replacing cotton and coffee in parts of São Paulo State, too, for at the moment this new production is booming, and, without regard to the

quality of the land or the possible stability of the production, every one who can possibly plant oranges does so. The objective is quick profits —not the establishment of a stable form of rural life. Here the tree is planted, to be sure, but there is little else done to it beyond harvesting its fruit.

The domestic market is small, for the traditional Brazilian diet does not include much fruit. In São Paulo city, it is true, there is a notable increase in the popular consumption of oranges. But the bulk of the crop must find its way to a foreign market. In 1927 Brazil as a whole produced only 360,000 boxes of oranges; but by 1937 the production reached 5,000,000 boxes, and oranges ranked fifth among Brazil's exports. About a quarter of them went to Argentina, where the Brazilian oranges were able to compete with the fine Argentine and Paraguayan varieties. How long this current of trade can continue without invoking tariff barriers remains to be seen. About half the Brazilian production went to England, where the southern-hemisphere oranges reach the market at a time of the year when supplies from the northern hemisphere are low. The whole business is too new, and the markets are too recently found to merit any prediction regarding the stability of orange cultivation. But if it is not stable, the loss in Brazil will be at a minimum, for there has been a minimum of investment. If this is just another speculative cycle, then the workers in these new plantations will migrate elsewhere to the next boom region.

Use of the Land for Pasture

Always in the background of any speculative agricultural development there is the possibility of a return to the use of the land for pasture. Through the centuries cattle have provided the one steady source of income, although, of course, it is a moderate income, and in the grazing areas there are no rapidly rising land values. Yet a surprisingly large proportion of southern Minas Gerais and the neighboring parts of Rio de Janeiro State is devoted exclusively to pasture. Many parts of the formerly forested country have been so completely denuded of trees that the landscape in the dry season reminds one of the hillier parts of western Texas. In not a few sections, the pastures have been so heavily grazed that they are being seriously attacked by soil erosion. Nor is the carrying capacity of the land permanently benefited by the common practice of burning the grass in September, at the end of the winter dry season.

The pastures of the Southeast are used for beef cattle and for dairy cattle. Places located near a road or a railroad over which milk can reach the city of Rio de Janeiro in not more than eight hours are generally devoted to dairying. This is roughly a zone with a radius of not much more than 125 miles from the city. Beyond this zone there are several communities where Swiss immigrants have taken the lead in the manufacture of cheese. Unfortunately the Brazilian cattle are poor milk producers, and a better selection of stock would require greater investment in the care of the pastures. As in the Argentine Humid Pampa, the poorer scrub cattle are able to survive where better breeds could not.

Beef cattle are grazed on most of the pastures of the Southeast. Range animals from the more distant places, perhaps from the sertão, are brought to the better pastures of the once forested country where they are fattened. Cattle are driven on the hoof to the fattening pastures, and then shipped by rail to the consuming centers. The slaughterhouses of the larger cities are greedy; and because of the desire for fresh rather than refrigerated meat, the supply must be regularly maintained.

Deffontaines has described a form of tropical transhumance in the mountain regions of the Southeast (172). During the rainy summers the animals are either driven, or drift without much care, into the higher parts of the Serra da Mantiqueira, chiefly to avoid the floods and the insect pests which are especially annoying at this season at lower altitudes. They remain on the high pastures from September or October until May or June when the failure of the water during the dry winter season forces them back to the lower altitudes.

Shifting Cultivation of Food Crops

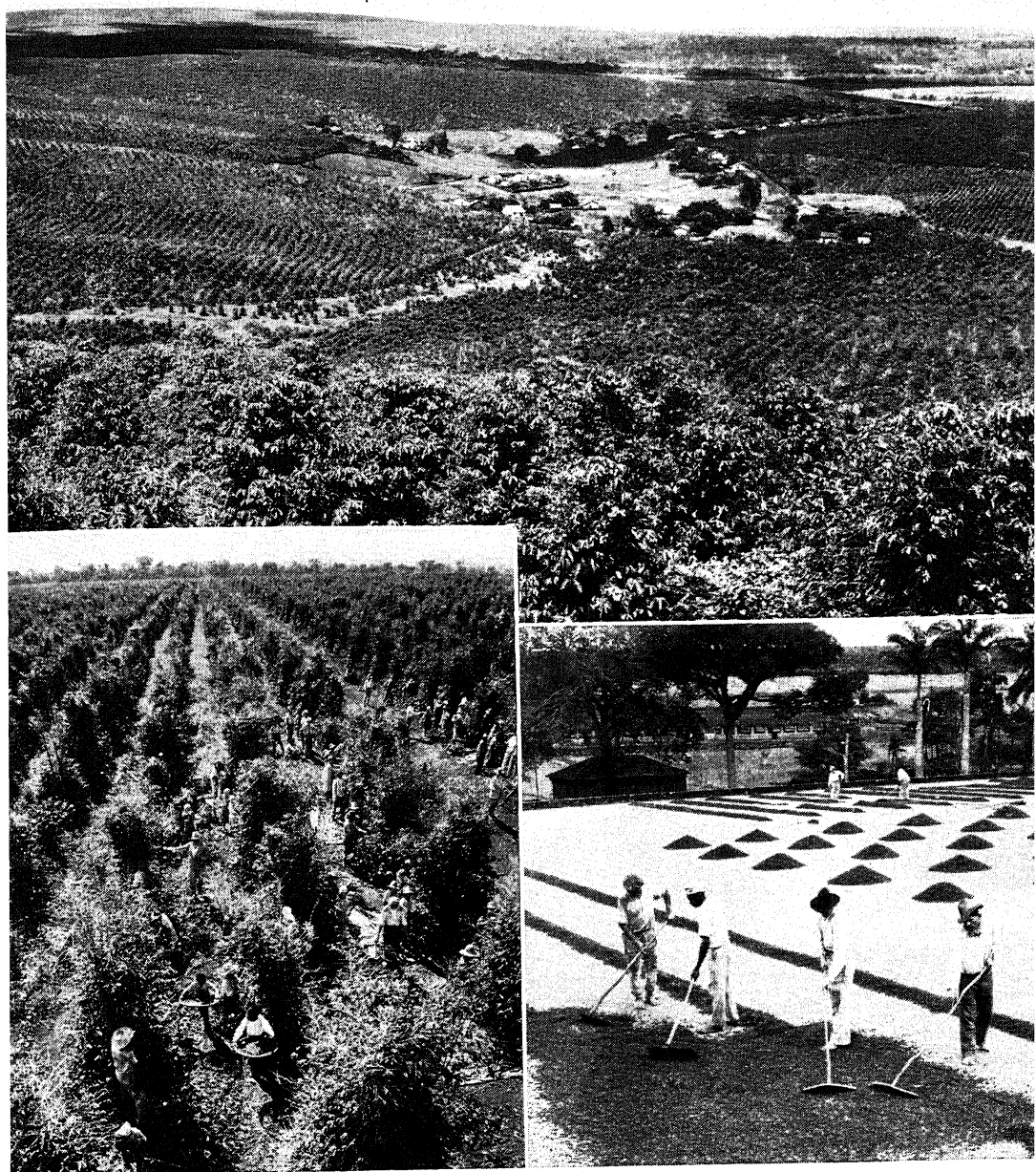
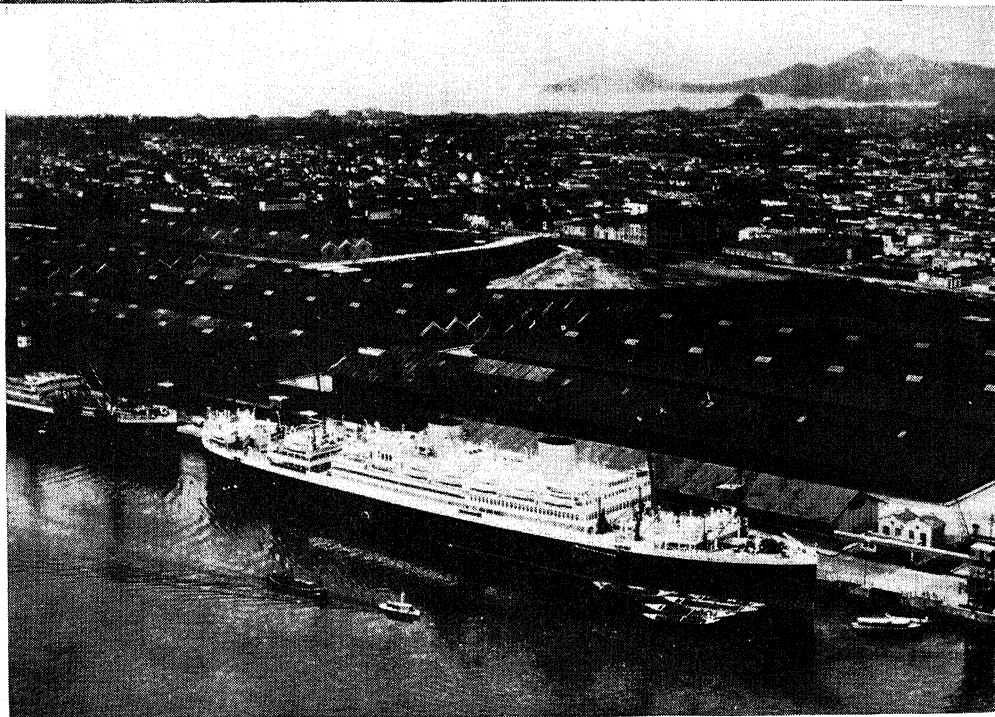
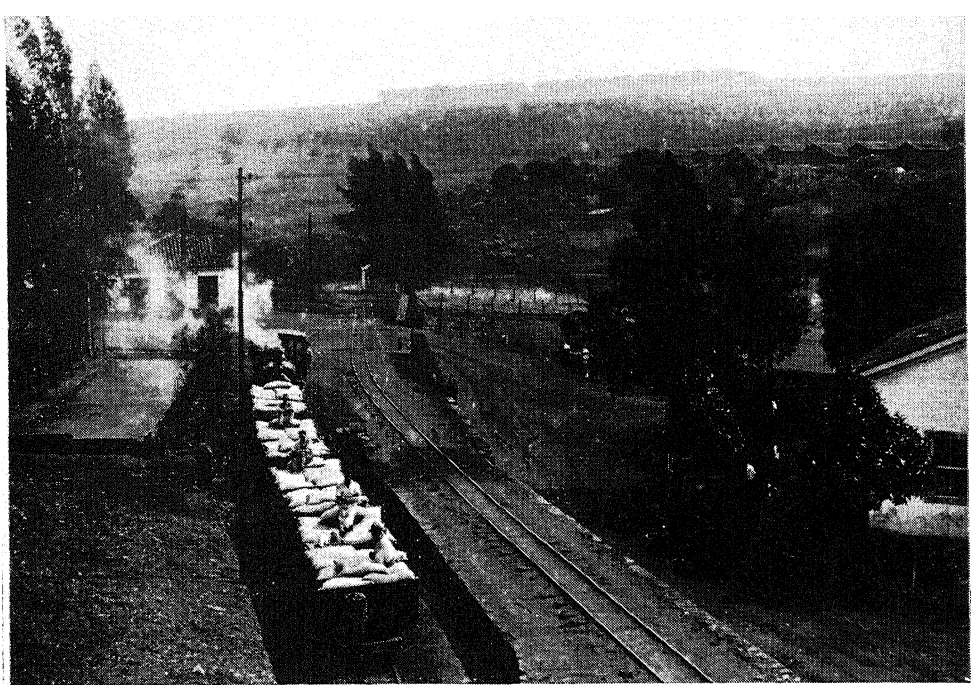
On most of the fazendas of the Southeast, whether they are devoted to the grazing of animals or to the production of a commercial crop, certain areas are given over to the production of food for local consumption. These areas are temporary and are shifted from year to year. They are worked by renters who make small payments to, or share a part of their crop with, the landowners. The food crops are chiefly maize, rice, beans, bananas, and manioc. The little patches of land devoted to these crops are scattered without regard to slope or position. Observed from the air the complete lack of adjustment between the small fields and the land itself or the pattern of roads and villages is striking. The lands devoted to these crops look as if they had been thrown like pieces of paper from an airplane and had become fixed wherever they chanced to fall.

There are two reasons for the haphazard arrangement of food crops. The first reason is that the cultivation is shifting and not permanent. With this method of farming, the soil continues to yield well only for two or three years, after which the garden patch is abandoned and permitted to return to grass or brush, while a new spot is selected for cultivation. The second reason is that the hoe rather than the plow is the chief implement. For hoe cultivators, any slope up to as much as 35° is just as arable as level land would be, and certainly much easier to work on. A change to plow cultivation would introduce a great change in the significance of slopes in terms of human use, and would greatly reduce the area of arable land in a country as hilly as the Southeast of Brazil.

Over a long period of time, the shifting cultivation of food crops, together with the practice of burning the brush to make more pasture, has resulted in the complete destruction of the forest. Through the centuries the land which seems so empty has actually been used again and again, until its productivity is all but exhausted. The disastrous results of long-continued destructive exploitation of land resources by a shifting population are here exhibited in the emptiness of the rural landscape and in the poverty of the rural people.

Centers of Agricultural Progress

There is another side to this rather dismal picture, however. Modern agricultural schools offer instruction by thoroughly competent staffs to those who wish to avail themselves of the opportunity. The new Escola Nacional de Agronomía is located in the Baixada Fluminense not far from Rio de Janeiro. In rural Minas Gerais two agricultural colleges are of special importance because of their location in the midst of agricultural and pastoral communities. One is located in Viçosa in the southeast and the other in Lavras in the southwest.

New agricultural practices are spreading around all these centers. Better breeds of cattle and better techniques in caring for the animals are being adopted. Plows drawn by oxen are beginning to replace the hoe and motor trucks are replacing oxcarts. The traditional Brazilian practice of planting tree crops in vertical rows on the hillsides, which is the easiest practice where the hoe is used but which leads to the maximum of soil erosion, is being attacked by the demonstration on experimental farms that trees do better in horizontal rows. The beginning of a new era for the farmers of the Southeast is making its appearance around these modern agricultural colleges.

The upper picture is of a coffee fazenda in the interior of São Paulo State. The coffee trees are set out on the hillsides. In the valley is the estate headquarters with the owner's residence, workers' homes, and the special structures needed for preparing, bagging, and shipping coffee. (Courtesy of the Brazilian Government Trade Bureau.) The photograph at the lower left shows a group of laborers picking coffee on a large fazenda. In the picture at the lower right we see how coffee is spread to dry on a platform made of tiles or bricks. In this part of Brazil, where the most numerous coffee laborers are Italian, the colored worker is ... (Photos by Margaret Bourke-White, courtesy of the American

A branch railroad (*above*) has been built to carry coffee in bags from this large fazenda near Ribeirão Preto in the state of São Paulo. (Courtesy of Pan American Airways.) Most likely this coffee is bound for the docks at Santos (*below*) which is the largest coffee-shipping port in the world. Here special loading devices are installed, capable of delivering fifty or sixty bags of coffee per minute to the hold of a ship. The Santos river is seen in the foreground; the Atlantic

COLONIES OF SMALL FARMERS IN THE SOUTHEAST

In contrast to the traditional forms of rural settlement in the Southeast are the attempts made under government direction to start colonies of small farmers, working their own lands. Attempts of this sort date back to the early nineteenth century. In 1818, for example, a group of Swiss were given lands near Nova Friburgo in the Serra dos Orgãos. Unfortunately this colony never prospered, chiefly because of its isolation from any possible market for its surplus products. From a maximum of some 1,600 persons, the number dwindled to not more than a dozen families. Nevertheless, these Swiss immigrants are responsible for the start of cheese production in many of the communities of Rio de Janeiro and southern Minas Gerais, and for many of the delicious brands of cheese sent regularly now to the city markets.

Another group of colonists established since 1900 in the Serra da Mantiqueira has not been any more successful. Germans, Italians, and French were brought to Brazil with government aid and given lands in this mountain region north of the Paraíba Valley. Most of the original settlers have drifted away, and some of their settlements are now completely deserted. Isolation is chiefly responsible for this failure also; for isolation imposed the necessity for self-sufficiency, and self-sufficiency made impossible the kind of prosperity and material gain which the immigrants desired.

A more important current of pioneer, small-farmer settlement was directed to the mountains of Espírito Santo. The coast of this state was one of the earliest parts of Brazil to be occupied by the Portuguese; but the settlements were so continuously subjected to the attack of warlike Indians that the Portuguese were forced to abandon all but a few defensible spots. In the nineteenth century a considerable part of the forest lands of western Espírito Santo was cleared and planted with coffee by the large landowners moving in from Minas Gerais. But the zone in between these two areas of Brazilian settlement—between the coastal towns and the coffee fazendas of the western border—remained unoccupied.

As the Indians were little by little subdued through contact with the Brazilians, this mountainous and heavily forested country in central Espírito Santo was open for European colonization. At first, from about 1840 to 1850, the colonists were chiefly Austrian and German; from 1877 to 1899 was the period of Italian colonization, which accounted for some 65,000 persons, a little less than double the estimated number of Ger-

mans; in more recent years, Poles have added a different element to the settlers. In each case the land was divided into small properties, about 125 acres each; and the newcomers built substantial homes and did their own work. They planted maize, rice, manioc, and coffee, depending on the latter crop for a cash return. Where the mountain settlements were too high to produce coffee, they have for the most part been abandoned: but coffee during the nineteenth century brought its growers enough profit to enable the colonies at lower altitudes to become prosperous.

Prosperity from coffee, however, did not mean stability. After a few years the coffee plantations of Espírito Santo, being cultivated by the inadequate methods in use throughout this part of Brazil, began to show declining yields. The large financial rewards to be derived from coffee production on virgin soils, together with the abundance of new lands near by, made available by the pacification of the Indians, was too much for the stability even of the small proprietors. Not only have the children of the first settlers moved on toward the north, but also many of the original settlers moved to new clearings. A frontier of new settlement has crept steadily northward toward the Rio Doce; but, since the current of new immigration was greatly reduced after 1914, this frontier has become a hollow one—that is, its advance is accompanied by the depopulation or the abandonment of the older settlements behind. These older clearings were in many instances rented by Brazilians who utilized them for cattle pasture. In 1926 a new bridge over the Rio Doce at Collatina opened the way to the sparsely settled country to the north, where the descendants of the Botocudos now practice a shifting cultivation of subsistence crops. Settlement has gone forward in this area, again with coffee as the chief crop. So this peasantry of small farmers, yielding to the lure of speculative profits from the use of virgin lands, has itself become migratory.

Another section of the Southeast where small farmers have been established on the land has a brighter future. The lowland back of Guanabara Bay, with its half-orange-shaped hills and its tidal swamps, was never an important area of settlement. It was a matter of comment among the travelers to Brazil during the nineteenth century that most of the food supply for Rio de Janeiro city came from a great distance: from Campos, from São Paulo, from Minas Gerais. There were only a few sugar estates on the more favorable sites; a few coffee plantations which were later used for cattle. The demand for charcoal for use in cooking in the city resulted in the rapid destruction of the forest; but the lowland was so empty of permanent settlers that it has often been described as a sertão.

In 1935 the federal government began work on an ambitious plan to drain and clear the swamps which border Guanabara Bay. Dikes and gates permit the escape of water from the rivers at low tide, but bar its return at high tide. Mangrove is being cleared away, and a considerable area of rich soil reclaimed. On these new lands, with malaria and other diseases of the tropical swamps now under control, small proprietors will be established on lots averaging less than ten acres each. Some of the settlers already occupying the first sites are Brazilians from the city of Rio de Janeiro; there are small numbers of immigrant Europeans and Japanese also included in the first group of colonists. This project seems to have advantages of access to a large market which the other colonial schemes have lacked.

MINERAL INDUSTRIES IN THE SOUTHEAST

Agricultural and pastoral settlement in the Southeast, then, has not led to the establishment of any large numbers of people on the land with anything like permanency or stability. But the Southeast possesses other resources than those of soil and vegetation. This region also has a remarkable store of minerals, of which gold is by no means potentially the most important. Although the decline of the placer gold workings left many of the earlier settlements of Minas Gerais stranded, this decline was not the result of the exhaustion of the minerals but only the playing out of the more obvious and accessible deposits. There is still a wealth of gold and diamonds, and in addition there are many other minerals of vital importance in terms of modern large-scale industries. Perhaps these mineral resources may lead to the development of a stabilized pattern of settlement where farming and stock-raising failed.

One of the sources of gold, indeed, has continued to support a stabilized mining community for more than a century. This is the famous Morro Velho mine, which was opened up by a British company in 1834 and has been continuously in operation ever since. It is located in the Serra do Espinhaço, a short distance south of Belo Horizonte, at a place where a most unusual ore body was discovered. Morro Velho has the distinction of having one of the two deepest mines in the world: its shafts have followed a rich gold-bearing vein to a depth of more than 8,000 feet. At a depth of 6,726 feet, the rock in the shaft had a temperature of 121°, and it was necessary to build an air-cooling plant to permit operations at lower levels. Yet the richness of the ore has provided a steady income in spite of increasing costs. Near the entrance to the mine is the

little town of Nova Lima (10,000 population)—a long stabilized community of company employees, including a group of resident British managers and technicians.

Iron

Brazil's outstanding mineral reserve, however, is its extraordinary supply of iron ore. Something like thirteen billion tons of ore are to be found in the southern and eastern parts of the Serra do Espinhaço, chiefly in that part drained by the headwaters of the Rio Doce. This reserve was estimated about 1935 to constitute 23 per cent of all the iron ore of the world. Furthermore, it is one of the richest known deposits. With an iron content ranging from 50 to 65 per cent, and with very few impurities (phosphorus, for example, only .02 per cent), this ore is richer than most of the iron deposits today in use in the industrial regions of Europe and North America. There can be no doubt that Brazil possesses iron reserves of such quantity and such quality as to place her foremost among the nations in this resource. Furthermore, all of these ores are so disposed that they may be mined by simple quarrying, without expensive tunnels and shafts.

The value of the iron ore to Brazil, however, remains to be seen. The Brazilians were aware of the existence of iron in their country as early as 1590, a century before gold was discovered in Minas Gerais, but no special value could be attached to so large a body of ore until the world found a use for it. It was not till the middle of the nineteenth century that there was any great demand for iron ore, and in this age of revolutionary chemical and metallurgical inventions nothing is less certain than the future of any mineral. There will be no certainty regarding the wealth iron ore may create for Brazil until the wealth has been created.

Up to the present time the ores of Minas Gerais have scarcely been touched. When their quantity was first announced in 1910 by the North American geologist Orville Derby, then head of the Brazilian Geological Survey, there was a scramble for mining concessions. The Brazilians themselves secured some of the concessions, but claims to the largest ore bodies were established by British, North American, French, and German capitalists. The largest single ore body, located near the town of Itabira (Map 89), is now in the possession of a syndicate of British and North American interests.

Up to the present time there has been no large-scale mining in Minas Gerais, but small-scale operations have long been carried on. Several steel

plants are located near the mines, notably at Sabará and Caeté (Maps 86 and 89). The total production of these small companies in 1937 amounted to 98,000 metric tons of pig iron, 71,000 tons of soft steel, and 76,000 tons of hard steel. Since the Brazilian market for steel and pig iron is between 300,000 and 400,000 tons each year—chiefly for re-enforcing rods for concrete structures, or wire, sheets, tubes, and rails—the domestic production can satisfy only a small proportion of the total demand. The small-scale steel plants, however, turn out a high-grade product. For fuel they depend on charcoal, and with the passing years the forests which are cut for this purpose must be sought at greater and greater distances. All the operators, in an industry where a shut-down means disaster, fear the possible traffic jam on the Central which would cut off their charcoal supply. The Eucalyptus plantations which have been set out in many parts of the Southeast have not provided a solution to this problem, so rapid is the consumption of wood.

Since 1919 the owners of the Itabira mines have been trying to get permission from the Brazilian government to construct a new railroad to the coast. The Central with its single-track line, its many curves and steep grades, and its inadequate rolling stock was not believed to offer the cheapest means of transportation to an ocean port for the shipment of ore on a vast scale. The Itabira project called for the construction of a new railroad through the valley of the Rio Doce to a special ore port north of Vitória. The railroad and the ore port were to be devised to handle heavy shipments which would be carried to the industrial centers of Europe and North America by a fleet of ore boats. For various reasons the Brazilian government has hesitated to grant the concession for this new railroad which would, among other things, completely reorient the economic life of the Southeast.

In 1940 the Export-Import Bank of the United States granted a loan to Brazil for the development of a modern domestic steel plant. The Brazilian engineers in charge of the project plan to locate the mills in the Paraíba Valley, a little west of Barra Mansa. The ore is to be brought over the Central from mines in the southern part of the Serra do Espinhaço 235 miles away. The Brazilians hope to be able to make use of domestic coal. In the state of Santa Catarina there is low-grade coal which can, however, be made into coke in spite of its high ash and phosphorous content. The fuel is to be shipped by boat to Rio de Janeiro and other small ports near by, and thence by rail over the Great Escarpment to the steel mills. So pure are the Brazilian iron ores that the usual ratio of coal to iron can be reversed—making it possible to use more iron

ore than coal in the steel-making process. The problem remains to bring the railroad lines up to the standard of effectiveness which will permit the uninterrupted shipments of raw materials and fuels.

The location proposed for the new steel plant in the Paraíba Valley is an excellent one in terms of the domestic market for steel. About 45 per cent of the steel will be used in São Paulo and about 30 per cent in Rio de Janeiro; the remaining 25 per cent will be consumed in other parts of Brazil which are most easily reached by steamer through Rio de Janeiro. The prospects are bright for the establishment of a stabilized industrial community in the Paraíba Valley, and for the development of the surrounding rural areas for the production of food for the urban workers. Perhaps this marks the beginning of a new era for the Southeast, and for Brazil as a whole—an era of steel and heavy industries.

Other Mineral Operations

The Southeast of Brazil contains also a wealth of other minerals, mostly concentrated in and about the Serra do Espinhaço. This part of Minas Gerais, for instance, is one of the world's leading sources of manganese —one of the hardeners of steel. Manganese mines have long been in operation, but the majority of the mines have been opened up since the beginning of the First World War. Most of the manganese deposits are in the southern part of the Serra do Espinhaço, along the line of the Central; shipment is by way of the Central to Rio de Janeiro. Manganese exports, even in the peak years of the First World War, did not involve such tonnages as might result from the potential iron-ore developments.

Central Minas Gerais also contains workable ore bodies of zirconium, chromium, molybdenum, nickel, tungsten, diamonds, beryl, and quartz crystals. In fact, it is the only source in the world of commercial quartz crystals for electrical use. The diamonds, in the modern period, are used almost exclusively for industrial purposes, not as gem stones. The presence in this part of Brazil of large supplies of the ferroalloys, or hardeners of steel (manganese, chromium, nickel, molybdenum, and tungsten), is a matter of great importance to the United States, which, in spite of its extraordinary mineral wealth, does not possess important quantities of these essential items.

The minor minerals, however, are relatively insignificant in terms of population and settlement. Only where mining and manufacturing are to be developed on a large scale are considerable numbers of people

likely to be attached to the land, even temporarily. The other mining operations require the services of relatively small numbers of people, and the number employed in the mines fluctuates unpredictably with the conditions of the world market.

THE SERTÕES OF THE SOUTHEAST

The Southeast, like the Northeast, has its frontier of concentrated settlement, and beyond the frontier its sertões. The sertões of this part of Brazil include the São Francisco Valley in northern Minas Gerais and southern Baía, and also some of the land west of the São Francisco in the central state of Goiaz. This vast extent of territory is occupied by a scattered and predominantly pastoral people, with a density of population between two and ten per square mile. Most of the northern part of the area was peopled by frontiersmen from Baía in the eighteenth century, and the southern part was entered during the early nineteenth century by people scattering from the declining gold fields of Minas Gerais.

The only product to reach the outside world regularly from the sertões has been cattle. The inhabitants live a seminomadic existence around the widely scattered ranch headquarters, having few contacts with the outside world except those provided by traveling salesmen, or *mascates*, mostly Syrians, who come with mule loads of manufactured articles. Cattle are driven overland to the fairs which, as in the Northeast, are located on the edge of the more densely settled country. Those in Minas Gerais which have had a steady importance are held at Tres Corações and Campo Belo (Map 86).

The advance of the railroad into the sertões has had the effect of depopulating the surrounding country. As the narrow-gauge line of the Central advanced northward beyond Belo Horizonte, with the distant objective of Belém, the railhead acted like a magnet, drawing to it people who before had been widely scattered. At the present time Pirapora, on the São Francisco, is the railhead. This little town of 4,000 inhabitants is now growing, partly through the arrival of settlers from all the vast territory around it.

Great things are expected of the valley of the São Francisco. Good authorities assert that there is a huge area where soil and climatic conditions are ideal for cotton. Some cotton is actually produced today in small, isolated plantations near the river. A fleet of river boats operates between Joazeiro and Pirapora, giving access to the many small villages along the way. From the north comes salt secured by the evaporation

of salt water from springs located near Joazeiro. Januaria is an important community, for the salt, landed at this point, is carried by muleback over all the state of Goiaz. From southern Minas Gerais a small trade in coffee, maize, manioc, and lard is carried northward to the São Francisco in exchange for the salt, cattle, and cotton that move southward. Yet it is difficult to agree with the optimistic citizens of Pirapora that the advantages of this valley are soon to be realized, drawing to it a great influx of colonists. The physical advantages of the area for cotton may be all that is claimed for them; but the market for cotton is anything but certain and the source of the colonists is not apparent. Still, it is one of the characteristics of the sertão that great things are always about to take place and sometimes they do!

RIO DE JANEIRO

Perhaps nowhere in South America is the contrast between city and country sharper and more vivid than between the hinterland of the Brazilian Southeast and Brazil's magnificent capital, Rio de Janeiro. In contrast to the emptiness and poverty of much of the interior of the Southeast, Rio de Janeiro is one of the most strikingly beautiful cities in the world. Established originally where the knobby ribs of the coastal mountains border the western side of Guanabara Bay (Map 87), the city now occupies several narrow lowlands between projecting rocky ridges. It has extended both northward into the lowland back of the coastal mountains and southward to the crescentic beaches of white sand which are festooned from headland to headland along the Atlantic. During the period since the beginning of this century, the old, unhealthful, unimproved Portuguese city, which reminded one of an overgrown rural village, has been transformed into a metropolis. Fine new docks now border the bay; the mangrove swamps, once infested with fever-carrying mosquitoes, have been cleaned away, and along the margin of the water a stone seawall has been built, with a wide tree-lined avenue between it and the first row of buildings. In the downtown section, at one end of the famous Avenida Rio Branco, a group of new office buildings, constructed on modern lines, has made its appearance; and along the nearest of the Atlantic beaches, in the Copacabana District, modern-style apartment buildings and hotels face the open ocean. Against the background of green, forest-clad mountains, bare rocky cliffs, and blue water, the city presents an unforgettable picture in a frame of unparalleled design.

Not all of the city is beautiful, however. Rio de Janeiro has its poor districts, its slums, some of them located on the tops of the rocky ridges

which overlook the throbbing business district, or the gay beach at Copacabana. The 1,664,000 people who live in the urban area include many who are crowded into miserable homes, and who have little opportunity to appreciate the magnificence of the picture of which they are a part.

The modern-style skyscrapers strung along the bay or along the Atlantic give the impression that this growth is not something that has sprung from the land, but rather something which has come from across the sea. Investigation confirms the impression. Rio de Janeiro made its start, to be sure, during the great gold period of Minas Gerais, when it was selected as the outlet for the wealth of the Southeast. But when the capital of Brazil was transferred from Salvador to Rio de Janeiro in 1763, and especially when, in 1808, the Portuguese king, fleeing from Europe, made Rio de Janeiro the capital of the whole Portuguese world, the little town with its muddy or dusty streets, and its bad record for fevers, began to extend its influence far beyond the limits of its immediate hinterland.

In the modern period, Rio de Janeiro has actually left its immediate hinterland far behind. The hinterland of the capital city today is all of Brazil. Located midway between the clusters of people grouped along the coast in the Northeast, and those grouped along the coast in the southern part of Brazil (Map 1), and located also close by the economically most productive state of São Paulo, Rio de Janeiro has become the hub of commercial exchange for all these widely scattered communities, but its connections are *by sea;* coasting steamers, in fact, carry by far the greater proportion of Brazil's whole domestic trade. Of all the imports to Brazil from foreign countries in 1938, 41 per cent came to Rio de Janeiro. Some of these foreign goods were later shipped by sea from the capital to other ports in the north or in the south. Of the coastwise trade of the country, Rio de Janeiro accounted for about 20 per cent of the imports and 30 per cent of the exports. No small part, therefore, of the continued growth of Rio de Janeiro into a commercial and industrial metropolis of nearly two million people is the result of the fact that the great majority of Brazil's more than forty million inhabitants live near the sea, not inland.

Because Rio de Janeiro was chosen as the capital, as well as because it is pre-eminent in economic advantages, much of the wealth of Brazil has been concentrated there. The interests of the nation focus on the capital, and to the capital come the leaders of business, politics, and art. Like the picture in a crystal ball, Rio de Janeiro mirrors the complete Brazilian scene, from the throbbing activities of the cities to the utter desolation of the sertão.

15

BRAZIL: SÃO PAULO

ONLY A LITTLE MORE than two hundred miles southwest of Rio de Janeiro is another city of more than a million inhabitants—São Paulo. There are fewer than fifty such cities in the whole world, and only four which are located in low latitudes, two in India and two in Brazil. We can understand how Rio de Janeiro might have attained its great size, for, as we have said, in it are focused the interests of the people scattered over the whole of Brazil—not only the political interests of the nation but also the commercial, intellectual, and artistic. On first thought São Paulo might seem to be just another example of the trend toward a multiplicity of urban centers which we found to be characteristic of the Southeast. Yet cities of over a million are not created simply by decree; they achieve such numbers only as the result of the operation of social and economic forces. The processes which have led to the rise of this second metropolis and of the cluster of people in its immediate hinterland are of great importance to students who are seeking an answer to the riddle of an empty Brazil.

The cluster of people, of which São Paulo city is the urban nucleus, is of recent origin, and only since the middle of the last century has it wielded a predominant influence in Brazilian economic affairs. In the historical background is that great trilogy of wealth-bringing products—sugar, gold, and coffee. The story of São Paulo is the story of the sweep of coffee across the state, and of the consequences of that most recent wave of speculative exploitation. The beginnings date back to the early

decades of the nineteenth century, to a period when "coffee shoppes" had become a fad in England, and when coffee was being advertised as the cure for a long list of diseases. The new beverage gained swiftly in popularity. Again, as in the case of the spread of the sugar market centuries before, Brazil began to produce at the very beginning of a rising market, and went on to capture the larger share of the international trade. This is a commercial situation in which a maximum of profits are to be made by the producers with a minimum of investment in production. In the decade between 1870 and 1880 Brazil was furnishing about half of the world's supply of coffee; since 1900 each year it has furnished from 65 to 75 per cent; and in the meantime the total annual production of coffee in the world has increased from 8,000,000 bags between 1870 and 1880, to 25,000,000 bags between 1930 and 1940.

In this enormous increase in coffee production, the state of São Paulo has played a leading part. This one state has produced between 65 and 70 per cent of all the coffee in Brazil; and, as a result of the economic prosperity of the great era of expansion, this one state has furnished from 30 to 40 per cent of the revenue for the federal treasury of Brazil. São Paulo was the scene of a rapid increase of population, a rapid advance of the frontiers of agricultural settlement, and a rapid increase in land values on the advancing frontier of coffee production. The pioneer movement has continued to the present time. Of all the regions of concentrated settlement in Brazil, therefore, São Paulo is far in the lead in terms of commercial prosperity and financial and political influence.

São Paulo does not show that closeness of adjustment between people and place which one would expect if prosperity is in any way related to stability of settlement. Here in São Paulo, to be sure, we are not dealing with a region of declining population in a stage of decadence, for the population is still growing, and there is still the optimism of the frontier; nor are we dealing with a people who are backward in their agricultural or industrial techniques, for the Paulistas are famed for their readiness to adopt new devices and methods; nor are we dealing with a region which is isolated or difficult of access, for São Paulo is better off in its roads and railroads than is any other part of Brazil. Furthermore, the people are predominantly European with much less mixture of Indian and Negro elements than is found in the regions previously considered. Nevertheless we find in the midst of this expanding, vigorous center of Brazilian economic life the same looseness of attachment between people and land, the same temporary and destructive exploitation of the soil, the same shifting patterns of population, the same hollow frontier. But

all these things are developed here on a bigger scale and the processes of change are going on more rapidly.

THE LAND

The land on which these events are taking place is arranged with a pattern somewhat more convenient for the needs of the inhabitants than was the case in the Southeast. There is the familiar combination of crystalline uplands, low mountains, and tablelands of stratified rock as in other parts of the Brazilian Highlands, but the design of all these elements is much simpler than that of the Southeast. Along the low coast the climatic conditions are those of the rainy tropics, but in the highlands distinctly lower temperatures are experienced. In the southern part of the state, the beginning of the zone of transition appears between areas suited to tropical plants and areas from which such plants are excluded because of low temperatures and frosts. São Paulo also has the *terra roxa.*

Surface Features

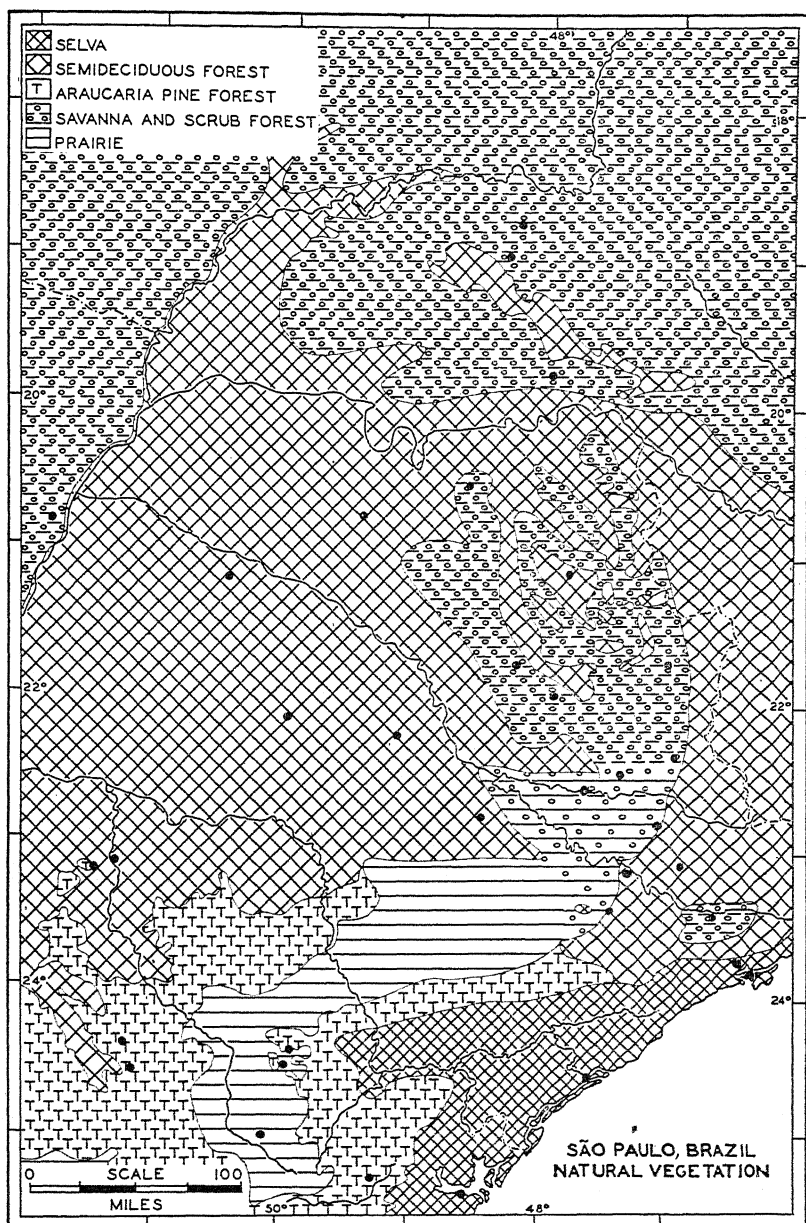
Immediately back of a narrow zone of wet lowland along the coast, the Great Escarpment rises to elevations between 2,600 and 2,900 feet (Maps 87 and 91). Generally the Atlantic margin of the Brazilian Highlands is composed of a wide zone of block mountains and narrow structural valleys, descending by a series of steps from the unbroken upland to below sea level. This is the situation in Espírito Santo and in Rio de Janeiro; and it is also the situation in the southwestern part of São Paulo State, where the angular valleys of the Zone of the Escarpment are threaded by the tributaries of the Rio Iguapé. But from a point somewhat southwest of Santos northeastward approximately to the border between the states of São Paulo and Rio de Janeiro, the Great Escarpment forms one unbroken slope from the edge of the upland to the sea. This is the section to which the name Serra do Mar was originally applied. Where the Iguapé brings down to the coast a heavy load of waste material worn from the eroded edge of the highlands, the foot of the Escarpment is bordered by a narrow alluvial lowland, rearranged by the waves and shore currents into long curving beaches of white sand backed by mangrove-filled lagoons. Santos is built at the easternmost end of this lowland fringe. Where the single slope of the Great Escarpment descends directly to the water's edge and is drained only by short torrents, so little alluvium is brought down that the bays and prom-

ontories are largely unmodified by bars and spits, and the island of São Sebastião remains separated from the mainland. The Baía de Sepitiba, on the border between São Paulo and Rio de Janeiro, is open to the Atlantic, with only the beginning of a sand bar forming on its eastern side.

Above the Great Escarpment the upland, which is drained by the tributaries of the Rio Paraná, has a conspicuously even skyline, especially striking as one reaches the crest of the Serra do Mar above Santos and enters the gently sloping hill country of the São Paulo Basin (Map 91). The valleys on the upland are broad and generally swampy along their bottoms; the interfluves rise in broad sweeping curves to the uniform summit elevation of about 2,600 feet above the sea. A few ranges of low mountains, or strings of mountain knobs, stand above this general level, and one such range separates the basin of São Paulo from the interior of São Paulo State. Between the São Paulo Basin and the Paraíba Valley there is a sharp drop: the Central Railroad which connects São Paulo with Rio de Janeiro by way of the Paraíba Valley descends about 550 feet in fifteen miles as it leaves the São Paulo Basin.[1]

Only the eastern and southern parts of São Paulo State lie within the area of crystalline rocks. On the inland side of the range of mountains which separates the São Paulo Basin from the rest of the state there is only a narrow band of crystalline upland. Beyond this the granites and gneisses disappear beneath a covering of stratified rocks, the layers of which dip gently toward the west and north. Map 91 shows the northern end of the great Paraná Plateau. Geologically this plateau is a structural basin of sedimentary rocks with layers of diabase (see also Map 6). The oldest sedimentary layers which rest on the crystallines are easily eroded by the streams. As a result, where these layers outcrop they have been excavated to produce an *inner lowland*, and the streams which descend into this inner lowland from the edge of the crystalline upland do so over falls and rapids. Along the margin of the crystallines in São

[1] Persons interested in the physiography of Brazil should note the river capture which has taken place east of São Paulo city. The São Paulo Basin is drained by the Rio Tieté, which crosses through a gap in the mountains northwestward toward the Parana. In recent geologic times, the streams which now form the headwaters of the Paraíba were tributaries of the Tieté. The big bend of the Paraíba is the result of the capture of these headwaters by the stream which flows eastward to reach the Atlantic near Campos (Map 87). The eastern part of São Paulo State which was thus transferred to the Paraíba drainage is now a conspicuously even-topped upland, with its summit level about the same as that of the São Paulo Basin; the valleys have been deeply incised in intrenched meanders below the upland surface.

SELVA
SEMIDECIDUOUS FOREST
ARAUCARIA PINE FOREST
SAVANNA AND SCRUB FOREST
PRAIRIE
48°
18°
20°
20°
22°
22°
24°
24°
0 SCALE 100
MILES
50°
48°
SÃO PAULO, BRAZIL
NATURAL VEGETATION

Map 92

Paulo there is a string of towns, such as Sorocaba, Itú, Campinas, and Mogi-Mirím, where the relationships are similar to those of the "fall-line" towns of southeastern United States, except that the rivers are flowing inland rather than toward the ocean.

Among the various layers of rock which cover the granites and gneisses in the Paraná Plateau, some are more resistant than others. In the midst of the inner lowland, for instance, there are certain strata which are enough stronger than the formations on either side of them to hold up a belt of low hills along their outcrop. But the inner lowland is sharply terminated in the north and west by the steep face of a cuesta, capped by almost vertical cliffs of diabase. This rock, which is of volcanic origin, was originally laid down in molten sheets either on the surface or squeezed between layers of rock near the surface. Being so much more resistant than the sedimentary rocks around it, the outcrop of diabase, throughout this part of Brazil, is marked by steep cliffs; and because the diabase layer dips toward the north and west, like the other rocks in the western part of São Paulo, the steep face of the cuesta is always toward the south and east athwart the lines of traffic. In southern São Paulo the general level of the inner lowland is between 1,900 and 2,200 feet above the sea; but the top of the diabase cuesta, like the top of the crystalline upland, rises some 600 feet higher. The cuesta is sharp and continuous where it enters São Paulo from Paraná, and is interrupted only in its northward swing where the northwest-flowing rivers have cut water gaps through it. In northern São Paulo, the diabase cuesta crosses the inner lowland and borders the crystallines, here standing above the general level of the hilly upland to the east. Since the diabase in the north is much broken by faults, the cuesta appears in detached pieces.

From the crest of the diabase cuesta the land slopes gently westward toward the Rio Paraná. Although the southern part of the Paraná Plateau is mostly composed of diabase at the surface, in São Paulo this rock appears only in a narrow band where its outcrop forms the cuesta. Most of the Paraná Plateau in western São Paulo is made up of sandstones resting on the diabase, with the latter exposed only in the valley bottoms (Map 6). Wherever the rivers encounter diabase in their channels they form rapids.

Soils

The soils of São Paulo State are closely related to the underlying rock. On the crystalline upland a reddish clay soil, known as *massapê*,

is formed similar to that found throughout eastern Brazil where the crystallines are exposed under a semideciduous forest cover. Among the soils of the Paraná Plateau, the *terra roxa*,[2] formed on the outcrops of the diabase, is the best known. This is a deep, porous soil containing considerable humus (176), which can be easily recognized by its dark reddish purple color. When it is wet it becomes so slippery and sticky that travel over it is very difficult, and in dry weather it gives off a powdery red dust which stains everything it touches. On the outcrops of sandstone, a light-colored, sandy soil is formed, known as *terra arenosa*. These popularly recognized soil types are being given scientific definition and will soon be mapped by the new soil survey of the state.

Soils cannot properly be described in general terms such as good or bad, fertile or infertile. Fertility is always in relation to the use intended for the soil. The terra roxa, for example, is excellent for coffee trees, especially as its porosity allows the roots to penetrate far into the ground. Its chemical composition, however, is such that, for cotton, it is an inferior soil, for the plant tends to form branches and leaves instead of fiber. Detailed technical studies by soil specialists and agronomists are needed in any agricultural region to determine which soils and which techniques are best suited to bring desired results. One important point regarding many of the soils of São Paulo has recently been set forth: that is their tendency to erode rapidly, especially when they are used without fertilizer for the production of cotton. When the terra roxa is allowed through bad agricultural practices to dry out at the surface it is especially liable to erode badly during the next heavy rain.

Climate and Vegetation

São Paulo as a whole is a region of abundant moisture. Along the coast the amount of cloudiness and rainfall is great. One of the rainiest places in Brazil is found on the slopes of the Great Escarpment and of the Zone of the Escarpment. An average of nearly 150 inches is recorded on the Serra do Mar between Santos and São Paulo. The zone of heavy rains, however, is narrow; São Paulo city, less than thirty-five miles from Santos, receives an average annual rainfall of only 56 inches. Most of the state receives between 50 and 60 inches (Map 9), and only the Great Escarpment and the Zone of the Escarpment are likely to remain sparsely inhabited because of excessive moisture.

A very important change occurs in the regimen of the rainfall along the

[2] *Roxa*, in Portuguese, means "purple"; it is pronounced ró-shah.

southern boundary of São Paulo. In the south there is no winter dry season such as is found generally throughout the highlands of tropical Brazil. A little south of Sorocaba a rather sharp line separates the area of winter drought from the area of year-round rain.

Temperatures show marked differences between the coast and the interior of São Paulo. At coastal stations like Santos the temperature is moderately high, ranging from 66° in winter to 75° in summer. On the higher parts of the plateau average temperatures are some ten degrees lower. At São Paulo city the coldest and warmest months average 58° and 69° respectively. Toward the west and north in the interior of the state the temperatures increase; in the valley of the Paraná the average of the coldest month is above 65°.

There is an important temperature boundary as well as an important rainfall boundary in southern São Paulo and northern Paraná. The northern limit of frosts occurs there. Frosts occur at times in the higher mountains of the Southeast, in Minas Gerais, but south of the latitude of Sorocaba they come frequently enough to make the planting of tropical crops somewhat hazardous. In the boundary area frosts occur only in the higher valleys and on south-facing slopes. In northern Paraná, frosts come almost every year, but they are distributed in patches or frost pockets, interspersed with many frost-free spots. In middle Paraná there are no frost-free spots on the plateau, and freezing temperatures are experienced every winter. Frosts do not occur along the coast, nor in the Paraná Valley and its deeper tributaries.

The various climatic features which have been described are nicely reflected in the pattern of the natural vegetation (Map 92). Along the coast and on the rainy slopes of the Escarpment there is a dense tropical rain forest composed of broadleaf evergreen species with many epiphytes and lianes. In the cloud zone of the upper part of the Escarpment the trees are moss-covered and the ground is almost constantly soaked with moisture. On the highlands, however, forests and grasslands are intermingled. Semideciduous forests once grew luxuriantly on the slopes of the mountains and over most parts of the crystalline upland; dense forests marked the outcrops of diabase to such a degree that some of the early travelers in that region said that a map of forests was a map of the geology. Semideciduous forests, becoming denser toward the west, covered the whole of western São Paulo down to the Rio Paraná. This river formed and still forms an amazingly sharp vegetation boundary, for immediately west of it begins the scrub forest in which there are many open patches of savanna.

Within the forested areas of São Paulo State there were numerous grassy openings. The São Paulo Basin, itself, was originally grass-covered, with trees only in the rainy zone near the crest of the Escarpment and on the surrounding mountains. The inner lowland was occupied by savanna with scattered scrubby trees and with galeria forest along the streams. South of Sorocaba, however, where there is no longer a dry season, the savannas were transformed by degrees into pure grass prairies, which the Brazilians call *campo limpo*. These prairies continue southward into Paraná.

The tropical semideciduous forest mixes with the midlatitude forest of Paraná in a wide zone of transition in northern Paraná and southern São Paulo. The forests to the south are composed of Araucaria pine with an undergrowth of broadleaf species not unlike the pine-oak forests of the southern Appalachians. Where frosts occur irregularly pines grow in those places which have frosts once in every ten years or so; the semideciduous forest is evidence that the place is frost-free (191).

SETTLEMENT BEFORE THE COFFEE PERIOD

The first permanent settlement on the highlands of Brazil was a mission founded in 1554 on the site of the city of São Paulo. Many settlements had already been made along the coast and, in the Northeast, the coastal zone was beginning to witness the rise of the sugar-planting. No route from the coast to the highlands anywhere south of Salvador offered greater ease of penetration for the colonial Portuguese than the one from São Vicente (near Santos) to São Paulo. Not only was this part of Brazil inhabited by fewer and less hostile Indians than the region between Cape Frio and Salvador but the physical barriers to penetration of the interior were narrower here than they were anywhere else. A single ascent led from the coast to the upland, but, what was more important, the forest belt in this section was narrowest (Map 7). To be sure, this ascent offered no advantages like those of the broad valley of the Rio Doce; but the Portuguese were less interested in an easy climb than they were in avoiding heavy woods. When a road was built over the Great Escarpment to São Paulo it made the ascent not by the easier grades now followed by the São Paulo Railway, but over the very nose of a steep spur where the forest was a little less dense than in the ravines on either side. At no other point along the coast between Salvador and southern Brazil could the barrier of rain forest be crossed in so short a distance. Less than thirty miles inland the settlers came upon the open campos of the

São Paulo Basin. Unlike the North American pioneers who built their homes in the woods and shrank from the open prairies, these Portuguese settlers felt secure only when they had emerged from the forest. The São Paulo mission was founded on the lower terraces overlooking the swampy valley of the Tieté in the midst of country covered with tall grass and scattered thickets of scrub trees.

The people who came to São Vicente and São Paulo were not wealthy. Anyone in Portugal with private means or with any standing at court went to Salvador or Recife; others came to São Paulo. They were a vigorous, energetic, adventurous people, and, coming mostly from the south of Portugal, they inherited no small amount of Moorish restlessness and lack of stability. They could not afford Negro slaves and the Indians were poor workers; nor was the land in the São Paulo Basin productive of wealth-bringing crops. So they began to look for other sources of wealth.

The Bandeirantes

For more than a century expeditions from São Paulo pushed into the interior of the continent, searching restlessly for sources of profit. A glance at the map (Map 5) will indicate the enormous extent of territory they covered. From the shores of the Plata to the banks of the Amazon, the bandeirantes tramped through the endless sertões pasturing their herds of cattle. They stopped here and there to pan the stream gravels for gold or to plant temporary fields of maize. They mated with the Indian women and increased their numbers by hordes of mameluco children. They were not gentle people, these bandeirantes. Wherever they found Indians grouped together around one of the Jesuit missions they carried them away to be sold into slavery. When there were battles to be fought, or dangers to be encountered, the bandeirantes were ready and eager. Their expeditions were more than simply exploring parties: they constituted a way of living for a restless people in a land which, for them, contained few resources they could turn into wealth. They pushed the boundaries of Brazil far to the west of the original line of demarcation between Spanish and Portuguese territory (about 50° W. Long.). Few are the parts of this vast domain which have not been lived in, picked over—in a sense, ransacked; many little communities now lost in the great interior of Brazil had their origin in expeditions which remained in the wilderness instead of returning eventually to São Paulo. Not until gold was discovered in Minas Gerais in 1698 and in

Mato Grosso in 1719, did the wealth for which the bandeirantes had been searching at last come to some of them.

Sorocaba

The rise of the gold-mining communities of Minas Gerais, however, did not bring great prosperity to São Paulo, although many of the Paulistas were attracted to the new source of wealth. The large and growing population of the Southeast did offer a market for cattle and mules. In the sertões of the west and south cattle were permitted to graze and breed almost without care, and mules were raised especially in Rio Grande do Sul and the Banda Oriental. It is interesting that on the two sides of the continent there should have developed the same sort of mule and cattle trade, with trails leading northward to the centers of settlement from the remote prairies east and west of the Paraná-Plata. On each side, one town achieved major importance as the scene of the annual livestock market: Sorocaba, a little west of São Paulo, played the same role for eastern South America that Salta played for the western part (170).

Every year during June and July Sorocaba was crowded with people. Herders brought mules and cattle from the far south or from Mato Grosso; buyers came not only from Rio de Janeiro and Minas Gerais, but also from distant Baía and Pernambuco. During most of the period from the early seventeenth century until the railroads appeared in the late nineteenth century, Sorocaba remained the outstanding example in all of Brazil of a market town located on the border between the sertões and the regions of denser population along the coast.

THE SPREAD OF COFFEE OVER SÃO PAULO

At the close of the gold period, about 1800, São Paulo and the little towns around it were still on the border of the sertão. They formed the southwestern outposts of the area of relatively dense population which, as a result of the gold prosperity, had developed in the hinterland of Rio de Janeiro. São Paulo, Sorocaba, Campinas, and the other little towns of this part of the state were the not very prosperous urban centers of a not very prosperous pastoral and agricultural area, in which the fazendeiros, or fazenda owners, cultivated a few acres of maize and sugar cane, but derived most of their income from the sale of beef cattle. There was little then to differentiate this region from the other parts of the Southeast, of which it was essentially a part. When, in the early nineteenth century, coffee began to be grown in the Paraíba Valley, some of the planters

52°
50°
48°
18°
20°
22°
24°
LIVESTOCK RANCHING WITHOUT FORAGE CROPS
FOREST PRODUCTS
SEDENTARY SUBSISTENCE AGRICULTURE
SHIFTING CULTIVATION
COFFEE
ORANGES
COTTON
BANANAS
SUGAR
VINEYARDS
TRUCK CROPS
MIXED CROPS OF PARANÁ COLONIES
SÃO PAULO, BRAZIL
LAND USE
0 SCALE 100
MILES

Map 93

52°
50°
48°
47°
18°
18°
20°
20°
22°
22°
24°
24°
48°
URBAN
OVER 1,000,000
MORE THAN 100,000
LESS THAN 100,000
RURAL
EACH DOT 1,000
GOIAZ
MINAS GERAIS
MATO GROSSO
SÃO PAULO
PARANÁ
0
SCALE
100
MILES
SÃO PAULO, BRAZIL
POPULATION

MAP 94

around Campinas and Sorocaba added this crop to their small plots of maize and sugar cane. In the São Paulo Basin itself temperatures were too low for coffee.

In 1847 a forward-looking landowner from the vicinity of Limeira took a radical step. He had been cultivating the usual crops with Negro slaves, but realizing that slavery as an institution was doomed, he undertook, with government aid, to bring to his estate some eighty families of German peasants—four hundred persons in all—who were established as tenants, or *colonos.*

At first the change was slow, but the fifteen years between 1885 and 1900 witnessed the sudden transformation of the São Paulo region from an outlying part of the Southeast, to a new and independent region of settlement, focusing on the city of São Paulo and the port of Santos. This sudden transformation was the result of three developments which were so closely linked that to separate cause from effect is almost impossible. The three developments were the increase of the European and North American market for coffee; the spread of coffee over São Paulo State; and the rapid immigration into São Paulo State of millions of Europeans. The result of these three developments was the profound alteration of both the Paulista landscape and the Paulista way of living.

Immigration

The figures of the population of the state tell the story. In 1872 there were about 837,000 inhabitants, located chiefly in the Paraíba Valley, and in the mountains and hilly uplands of the territory around Campinas, Sorocaba, and São Paulo. In 1890 there were 1,384,000 people, and the frontier of new coffee planting was beginning to roll north and west. By 1900 the population of the state had nearly doubled, reaching 2,280,000. The increase continued, reaching 4,500,000 in 1920, 6,500,000 in 1934, and an estimated 7,131,000 in 1938 (175).

The rapid increase of population was the result of immigration which both caused and was caused by the increasing prosperity of the region. During the whole period from 1827 to 1936, São Paulo received 2,901,204 new arrivals,[3] but only 53,517 of these had come before 1886. In the fifty years from 1887 to 1936 the average annual immigration was nearly 57,000. In each of the years 1891, 1895, 1912, 1913, and 1929 the number of immigrants exceeded 100,000; but in 1903, after the first small financial

[3] Figures from Estado de São Paulo, "Movimento migratorio no Estado de São Paulo," *Bol. da Directoria de Terras, Colonias e Immigração*, Vol. 1, 1937: 31–158, and "Cincoento anos de Immigração," *Bol. do Ministerio de Trabalho, Industria e Commercio* (Rio de Janeiro), April, 1937: 301–314.

crisis of the coffee region, and in 1918, after the First World War, the number dropped below 20,000. Only in one year, 1915, did the departures outnumber the arrivals, but during the whole period about 48 per cent eventually left Brazil. During all this time Brazil as a whole received about 4,600,000 immigrants, a somewhat smaller number than entered Argentina. São Paulo's share of this immigration was about 60 per cent.

Many nationalities and races were involved in this migration. As in Argentina in the same period, Italians were the most numerous, coming in maximum numbers from 1890 to 1900, and again just before 1914. Since 1918 the number of Italian immigrants has dropped very greatly. After Italians, in total numbers, came Portuguese, Spaniards, Germans, Japanese, Russians, Poles, Austrians, Turks, Lithuanians, and others. Between 1918 and 1935 there was a large immigration of Japanese.

Most of the Japanese and many of the Germans went to the State of São Paulo, which also received immigrants from other parts of Brazil. The rise of São Paulo as a region of speculative agriculture led to much emigration from the older regions of settlement in Brazil. The number of Brazilians who came to São Paulo was exceeded only by the number of Italians. The state of Baía contributed the largest number of Brazilian immigrants to São Paulo, with the state of Minas Gerais second. The accompanying table gives the number and proportion of immigrants between 1827 and 1936 who came to Sao Paulo State:

IMMIGRANTS TO SÃO PAULO STATE—1827 TO 1936*

Nationality	*Number of people*	*Percentage*
Italians	942,903	32.50
Brazilians	494,834	17.06
Portuguese	413,161	14.24
Spaniards	386,613	13.33
Japanese	177,551	6.12
Others	486,124	16.75

Compared with the migration of Europeans into North America during this same period those who went to Brazil and to Argentina were only a trickle. The question can still be asked, "Why did so few people go to Brazil?" A part of the answer to this question is offered by the conditions of life on the *fazenda paulista*, and also by the objectives of the Europeans who were led to migrate in such numbers to the New World.

* From "Movimento migratorio no Estado de São Paulo," *loc. cit.*

It is probably a mistake to believe that the majority of the immigrants came because they desired freedom from oppression, or religious liberty. Most of them came because they had heard that in America one could become rich.[4] In North America some did become rich, but in South America, in Argentina and in Brazil, the immigrant worker found himself face to face with the long-established tradition of the aristocratic landowner and the tenant, of "master and man." Most of the profits derived from the spread of wheat cultivation in Argentina went to the landowners; in Brazil this same story was repeated, for the fazendeiros pocketed not only most of the income from the sale of coffee, but also the profits from the increase of land values. The wages paid to the colonos were only for subsistence, not a real share of the profits. Failing to gain a part of the "unearned increment" of land values, the immigrants to South America sent back discouraging reports which must have compared poorly with stories of the quick wealth to be made in North America.

The Fazenda Paulista

Nevertheless, opportunities to become wealthy are now much better on the fazenda paulista than on the fazenda mineira. Although in São Paulo State there are longer hours of work than in Minas, and the laborers are expected to work harder than in the easy-going Southeast, the wages are higher. Those who are diligent, thrifty, and perhaps lucky, have been able to purchase some land of their own or to move to the city and find employment in the factories.

Coffee production requires a considerable amount of labor. As a first step in the development of a new plantation, the landowner draws up a contract with a tenant obligating him to clear a tract of virgin forest and plant coffee. While the young trees are growing to bearing age, which takes from four to six years, the colono family is permitted to grow its own food crops, such as maize, rice, and beans, between the rows of coffee. At the end of that period, however, the colono must turn the plantation over to the owner and move elsewhere.

When the new coffee fazendas come into production, a large number of rural people are settled on the land. Unlike the tenants in most other parts of Brazil, those on the fazenda paulista are not scattered in individual homes, but are grouped together in villages. The owner himself commonly moves to his new estate, together with managers and overseers. The fazendeiros of São Paulo as a group are closely in touch with the

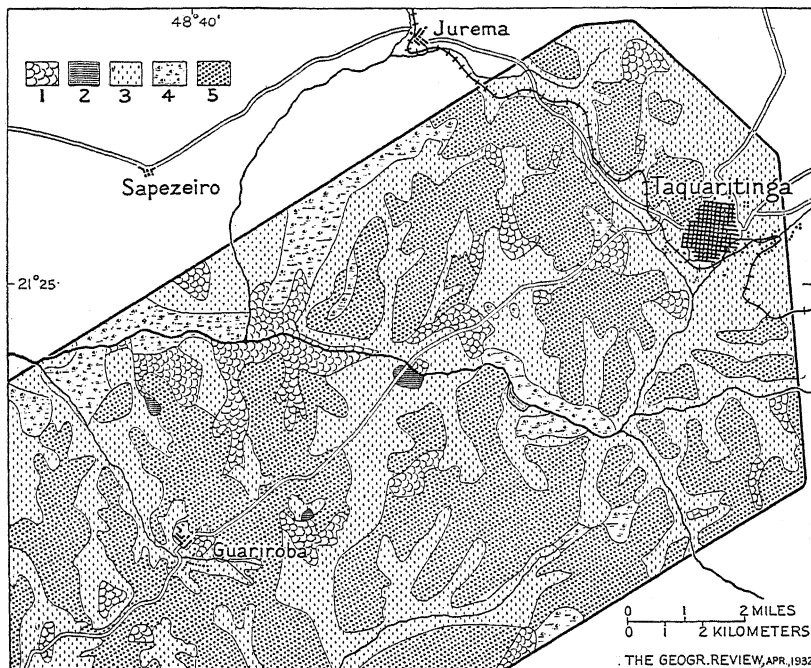
[4] See the treatment of this subject in R. F. Foerster, *The Italian Emigration of Our Times* (Harvard Economic Studies, Vol. 20), Cambridge, Mass., 1919.

business of producing coffee; they are not, like the ranchers of Argentina or even of other parts of Brazil, interested primarily in pastoral life and willing to leave farming to tenants.

The fazenda paulista, however, is by no means a social unit, as was the old sugar estate of the Northeast. It is essentially a business enterprise which brings a group of people together for a brief period for the sake of profit. Contracts with tenants generally run for only one or two years, after which the tenant family usually moves elsewhere. Not only is the tenant loosely attached to the land on which he works, but even the owner fails to develop any sentimental attachment to his property, and is ready at the first sign of decreasing profits to move on to the virgin lands of the frontier. The objective of both fazendeiro and tenant is more wealth; there is no intention of remaining permanently in the rural districts. The dream of every Paulista is a home in the city. This attitude of mind colors the whole relationship between the people and the land.

Layout of the Fazenda Paulista. The layout of the typical fazenda of São Paulo State resembles that of other parts of Brazil in the relation of its boundaries to the terrain. Estates are divided from each other along the ridge tops or drainage divides. The coffee trees are planted almost exclusively on the ridges and slopes, and almost exclusively also in vertical rows. The accompanying map of land use in an area near Taquaritinga (Map 95) shows what is typical of the central area of coffee production. The land devoted to coffee occupies the tops and sides of the ridges, less than half of the total area. The valleys are used for pasture or for food crops or they are left in brush. Standing on the ridge tops one can see little but coffee—long straight rows of coffee as far as the eye can reach. The people, the estate headquarters, and buildings and drying platforms of the fazendas are all grouped in the valleys, especially near the valley heads.

The fazenda paulista usually contains certain standard buildings and other equipment needed for the harvesting, drying, and shipment of coffee. The harvest, which begins sometime in May and lasts till August, consists in stripping the "cherries" from the branches of the trees and transporting them to a central part of the fazenda where the coffee seeds are to be extracted. First the cherries are dumped into large tanks of water in which the ripe and green ones are separated and the sticks and stones eliminated. The cherries are then carried to drying platforms, which are usually made of black tile to absorb the sun's heat. On many fazendas the transportation is by small canals, in which the

cherries are floated. On the drying platforms the cherries have to be raked over frequently and in case of rain must be quickly gathered into small piles and covered with tarpaulins. When the cherries are thoroughly dry they are put through a machine which removes the husks and then through other machines which grade the seeds according to shape,

MAP 95

1. Woods (7 per cent of area). 2. Truck crops, chiefly maize and vegetables (1 per cent). 3. Pasture (43 per cent). 4. Brush (6 per cent). 5. Coffee (43 per cent).

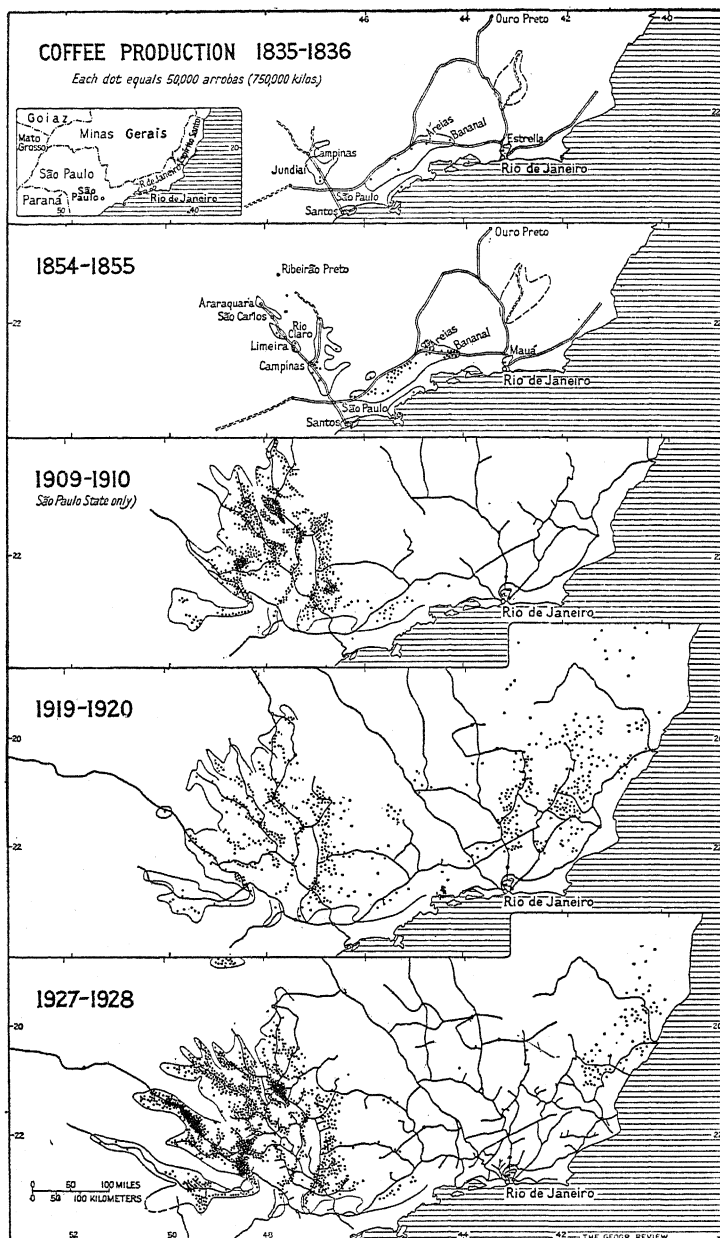
(Courtesy of the *Geographical Review*, published by the American Geographical Society of New York.)

weight, and size. The coffee is then put in bags (of 60 kilos each) and is ready for shipment or storage. All these processes require not only an abundant supply of cheap labor, but also a special set of structures—tanks, canals, drying platforms, husking and sorting machines, and storage sheds, as well as a home for the owner and homes for the tenants; all of these are found on the fazenda. A coffee plantation does not require as large an initial investment as a sugar usina, but the investment is too large for the small proprietor, and hence there is little hope for the colono who wishes to become a landowner.

Distribution of the Coffee Fazendas. The first advance of the coffee plantations into São Paulo State followed the preexisting roads, but as the qualities of the soil and surface best adapted to coffee were discovered, a pattern was gradually evolved which came more and more closely to resemble that of the underlying land (Map 96). Outside of the Paraíba Valley, the first part of São Paulo State to become a center of coffee planting was the district around Campinas, where, between 1860 and 1885, the new plantations supplanted the older Paraíba fazendas as the chief sources of coffee. From Campinas two roads led into the interior, and along these roads coffee made its advances. One extended northward along the edge of the crystallines through Mogi-Mirím to Uberaba in Minas Gerais; the other went toward the northwest, through Piracicaba (Map 91). For a time Campinas, at the focus of these two routes through the coffee plantations, grew more rapidly than São Paulo city.

Certain parts of the region soon appeared to be better suited to coffee than others. The open savannas were avoided in favor of the heavily wooded ridges. Already in the neighborhood of Campinas the planters had discovered the advantages of the terra roxa which had developed on the narrow dike of diabase that cuts through the basement crystallines near that town. It is on this dike, in fact, that the *Instituto Agronômico de São Paulo* with its big experimental plantations is now located. The fazendeiros soon discovered the terra roxa around Ribeirão Preto to the north and São Carlos to the northwest, and they concentrated their attention on these districts.

The great wave of coffee planting in the period between 1885 and 1900 followed not only the routes out of Campinas, but also moved westward from Sorocaba, encountering the diabase cuesta near Botucatú. Where the map of the forests once vaguely reflected the distribution of the terra roxa, the map of coffee began more and more to do the same thing, but with greater precision. So well have coffee trees planted on the terra roxa maintained their yields that the areas of diabase still appear on the coffee map as zones of concentration (Maps 93 and 94).

The spread of the coffee plantations, however, did not stop at the western edge of the terra roxa. In spite of the sustained yields no tendency to intensify the methods of production on the terra roxa has yet appeared. The lure of virgin lands beyond was too strong. On the interfluves between the various streams draining to the Paraná the coffee plantations have been pushed rapidly westward and northwestward, occupying the poorer sandy lands, which, however, give very high yields when they are first cleared. Fingers of settlement have been extended along the rail-

Map 96

(Courtesy of the *Geographical Review*, published by the American Geographical Society of New York.)

road lines to Barretos, Rio Preto, far out along the line to Mato Grosso beyond Araçatuba, to Marilia, and in the south as far as the Paraná. Coffee has also crossed the border into the northwestern part of the state of Paraná.

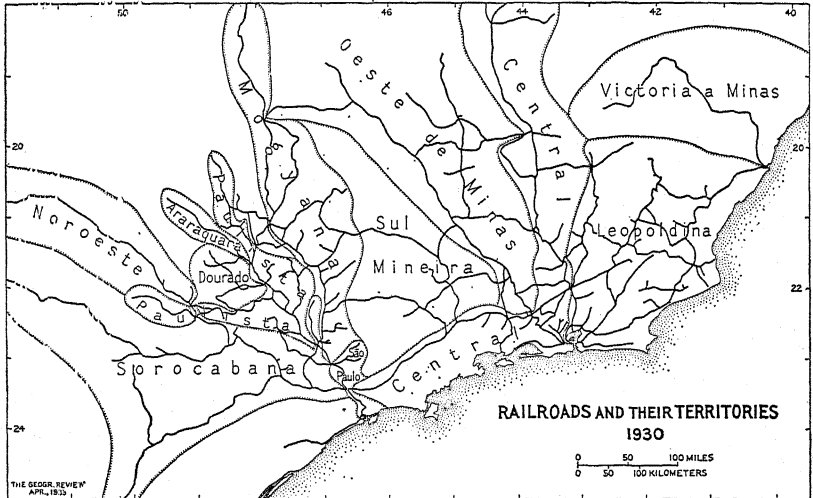
There are limits to the possible expansion of the coffee frontier. Frosts must inevitably stop the progress of the frontier in the state of Paraná. Southward, also, the lack of a dry season in winter will be a handicap, for the dry season is the picking season, and rainy weather prevents successful drying. To the north and west, the advance of the coffee frontier will be stopped, though more gradually, by higher temperatures. The crop does best where there is a combination of cool winters and hot summers; the absence of a cool season in winter—a condition found toward the west and north—would probably be unfavorable (Map 10). It is an interesting echo of the theme of "poorly arranged superlatives" that the largest areas of terra roxa should be found in Paraná and Santa Catarina where the climate is too cold for coffee, or in the valleys of northern São Paulo where it is too hot.

Other Uses of Land in the Coffee Region

Within the coffee region itself a relatively small proportion of the land has been used for the chief crop. Before 1875 most of the fazendas grew coffee on only a part of the cultivated land and used the rest for the traditional Brazilian combination of food crops—maize, rice, and beans—and sometimes for a little sugar cane and cotton. During the period of coffee speculation new plantations had almost all their cultivated lands in coffee; but the cultivated lands were only on the ridges, and on every fazenda a large proportion of the land was in valleys. The valley land was used only incidentally for pasture or small temporary gardens cultivated by the tenants for their own needs. Certain districts in the state specialized in other crops (Map 93). In the lowland around Sorocaba, for instance, a small area was devoted to cotton. Fruit orchards of various kinds appeared around Limeira and on the railroad between Sorocaba and São Paulo. Around the outskirts of the city of São Paulo there was a considerable development of truck gardening. Throughout the state the area devoted to pasture has regularly exceeded that used for all crops. In the year 1933–34 of the total area in land holdings, only 16.1 per cent was cultivated; and on this cultivated land coffee occupied 49.1 per cent, maize 21.7 per cent, rice 8.6 per cent, cotton 7.6 per cent, and other crops 13 per cent.

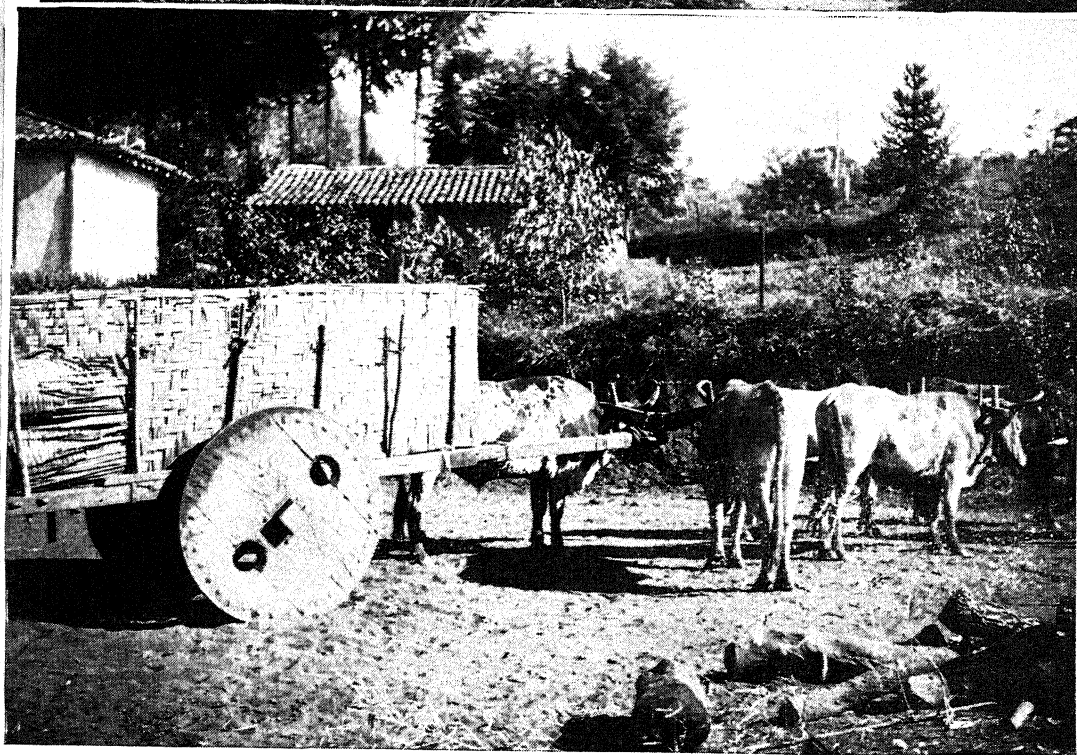
Lines of Transportation

During the settlement of São Paulo State certain dominant lines of circulation were established, first by the old colonial cattle and mule roads and later by the railroads. Today the zones of the several railroads are the divisions of the state which are known to the average citizen—rather than the natural divisions suggested by the geographers.

The first stem of the railroad system appeared when a British company built a line from Santos to São Paulo in 1867. The trains are lifted or

MAP 97

(Courtesy of the *Geographical Review*, published by the American Geographical Society of New York.)

lowered over the Serra do Mar by means of cables and stationary steam engines, burning British coal. Today the broad-gauge tracks of the São Paulo Railway pass through the city of São Paulo, and across the mountains which separate the capital from the interior, to the terminus of the line at Jundiaí. The contract under which the company operates prohibits the construction of any competing line between Santos and São Paulo until 1946. The São Paulo Railway is the bottleneck through which the products of the whole region must pass.

The interior of São Paulo, however, has three chief railroad zones (Maps 91, 93, and 97). The first is the zone where the Paulista, which is owned and operated by Brazilians, extends with the same broad gauge from the end of the São Paulo Railway at the Jundiaí through Campinas, Limeira, and São Carlos to the northern border of the state. A branch line

One of the finest railroads in the Western Hemisphere runs diagonally across São Paulo State. This is the Brazilian-owned, Brazilian-operated Companhia Paulista (Map 97). The picture above shows a train on the main line of this railroad equipped with one of the new electric locomotives and with luxurious steel cars which roll smoothly over a well-laid and carefully maintained track. (Courtesy of the International General Electric Company.) In contrast we see below a more common means of transportation in rural Brazil. The oxcart moves slowly, often accompanied by the shrill squeak of its ungreased axle.

The Great Escarpment north of Santos consists of one slope, known as the Serra do Mar. The air photograph above was taken from a point over the highland looking toward Santos. In the foreground is a reservoir from which water drops to an electric plant at the base of the Serra which furnishes Santos and São Paulo with light and power. Santos can be seen dimly in the distance directly beyond the tower. (Courtesy of the São Paulo Tramway, Light and Power Company.) The lower picture shows the commercial center of São Paulo. (Photo by the author.)

reaches the town of Marilia. Aided by the revenue from the richest part of the state, the Paulista is one of the better railroads in Brazil, in fact, in all South America, and compares well with the best North American lines.

The second railroad zone of São Paulo covers the northeastern part of the state which includes the rich coffee district around Ribeirão Preto. This zone is served by the narrow-gauge Mogyana which connects with the Paulista at Campinas. The Mogyana extends to Araguari, in the Triangulo of Minas Gerais, whence another company has built a line almost to Goiânia in southern Goiaz.

The whole southern part of São Paulo and most of the western part is covered by the zone of the Sorocabana. A narrow-gauge line goes westward from the city of São Paulo through Sorocaba. The main line continues westward to the Rio Paraná, but two important branches lead to the north and the south of it. The first branch connects at Baurú with the Noroeste, a railroad which has been built across the Rio Paraná and the state of Mato Grosso to the banks of the Paraguay not far from Corumbá (Map 48). This line is now being extended across the Bolivian Chaco to reach the oil fields near Santa Cruz. From a junction near Sorocaba the second branch extends, through connections with other lines, across the southern states all the way to the border of Uruguay where the railroads of that country offer regular service to Montevideo.

These various railroad lines extending far into the interior of the country are creating a larger and larger focus of transportation on the city of São Paulo. The advantages which São Paulo enjoys from its focus of railroads is not likely to be seriously disturbed by the recent construction of a new railroad to Santos from a junction on the Sorocabana not far from Sorocaba (Map 93). Many small branch railroads attached to the main trunk lines throughout São Paulo State give the coffee region a density of railroads exceeded in South America only by that in the Humid Pampa of Argentina. Also in the coffee region, for the first time in any comparable area on the continent, all-weather roads for automobiles and motor trucks are being built. Generally the zone which is accessible to a railroad is limited to a band not more than fifteen or twenty miles wide on either side of the tracks. Good gravel roads, however, greatly extend this area. Although the development of roads and railroads has gone far beyond anything to be found in other parts of Brazil, there are still districts of considerable size in which one of the major problems is that of securing sufficiently inexpensive transportation to make commercial activities profitable.

SÃO PAULO CITY

The growth of the city of São Paulo depends on the development of its hinterland. In 1883 the city had a population of only 35,000. There was little to distinguish it from many of the other small towns in the vicinity which had also been founded in the colonial period; its streets were narrow, irregular, and mostly unpaved; little had been done to modify the natural conditions of its site. In fact, Campinas had been growing more rapidly in the period before 1883 because it, rather than São Paulo, was the focus of the two chief routes of early coffee expansion.

Two important factors seem to have led to the sudden rise of São Paulo. In the first place, the spread of coffee cultivation between 1885 and 1900 opened up for the first time the zone of the Sorocabana, and the major focus of routes was shifted from Campinas to São Paulo. In the second place, São Paulo, being a little higher and cooler, was not subject to such serious epidemics of fever as Campinas. At any rate, it was in this period that modern São Paulo made its beginning. Several new manufacturing industries were started, including textile plants, shoe factories and other industries utilizing local raw materials. In 1905 Brazil was reported to have 110 cotton textile plants, employing 39,000 workers, and most of these were located in São Paulo and Sorocaba.

The population of São Paulo, from the 35,000 of 1883, increased to 239,000 by 1900; it was 340,000 in 1907; and in 1920 it had reached a total of 579,000. At present the population in the metropolitan area is not far from 1,500,000. These figures remind one of the rapid growth of industrial metropolises like Chicago and Detroit. São Paulo was transformed in a little more than fifty years from a small Brazilian town to a city which, to a greater and greater degree, has taken on all the characteristics, good and bad, of its North American prototypes (180). The enormous increase of population in São Paulo since 1920 is a result in no small part of the migration of workers from the rural districts.

Manufacturing Industries in São Paulo

Although industries are by no means new to this part of Brazil, the big period of industrial expansion, as in Buenos Aires, took place after the beginning of the First World War.

The new industries of São Paulo were given many advantages by the federal government because of the strong political influence of the Paulistas. One of these advantages was a high protective tariff. Another was a tax of two per cent on the value of all goods handled at all the ports of

Brazil except Manaus on the Amazon, and Santos, the port of São Paulo. In those industries for which the raw materials as well as the finished products have to be sent to and from other parts of the country by boat, this tax had the effect of compensating the cost of hauling goods over the steep escarpment. The result was the development during the last twenty years of the chief industrial center not only in Brazil but in all of Latin America.

The industries of São Paulo are varied. About 29 per cent of the investment and 38 per cent of the workers are in textile factories. The spinning and weaving of cotton, wool, and jute, and the making of hosiery and silk and rayon goods are the chief textile industries. Next come metallurgy and the construction of machinery, followed by clothing, foods and beverages, chemical products, cement and other building materials, and paper and rubber goods. Industries making use of local raw materials are responsible for 86 per cent of the value of the industrial products of São Paulo. Most of the automobiles and motor trucks now widely used in Brazil are assembled near São Paulo. In many cases the bodies are built of local materials. In 1937 São Paulo, together with its industrial suburbs and Sorocaba, had 9,051 factories, and gave employment to 245,715 workers.

One of the factors contributing in an important way to the industrial growth of São Paulo and the neighboring towns is the development of the near-by water power. The power has been developed by a Canadian company, which has also built the power system of Rio de Janeiro. On the very crest of the Serra do Mar, overlooking Santos, a reservoir has been located, supplied in part by the heavy rainfall, and in part by water pumped from the swampy Tieté Valley. From the reservoir, water is dropped 2,378 feet to a power plant at Cubatão at the base of the "Serra." [5] This is said to be the finest water-power site in South America, with a potential capacity of 750,000 horse power. An abundance of electric energy is available to supply all the needs of the city that can be predicted. In addition, there are smaller hydroelectric plants along the Tieté.

Even so great an industrial center as São Paulo, however, reveals the same curious weakness in rail connections previously noted in the cities of the Southeast. Not only are there several major railroad junctions in its hinterland which are entirely lacking in any urban development, but

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[5] A North American engineer, Mr. A. W. K. Billings, is responsible for this development. To him the people of São Paulo owe a very considerable debt of gratitude for the works which made possible the rise of their city to its present position.

the city itself is served by only four lines, two of which are single-track and one of which is narrow-gauge. The fact is that the hinterland of São Paulo is able to absorb only a small part of the industrial products of the capital, most of which are sold to urban people either in São Paulo city itself or in other cities of Brazil. In the interior of São Paulo State most of the many small towns have their own equipment of local industries, making furniture, clothing, beer, and many other items for the small local markets (179).

Urban Pattern of São Paulo

São Paulo city itself is a very different sort of place from Rio de Janeiro. In it we find a pattern similar to that of most big cities in the United States. The highly concentrated commercial district is the famous Triangulo where there are many tall buildings. The Triangulo is surrounded by a "blighted area" of old residences, and the new superior residence districts occupy the ridge tops or the outskirts of the city where real-estate operators have undertaken the necessary planning and advertising. The compact industrial districts are strung along the chief railroads. Surrounding the suburbs there are miles and miles of unoccupied residential subdivisions, laid out optimistically in the boom years before 1930.

THE DECLINE OF COFFEE

The development of the city of São Paulo and of its immediate hinterland was dependent upon the spread of coffee production over the state and the growth of the speculative fever which accompanied the spread. Now we must go back and watch the spread of coffee from another point of view, for speculation inevitably leads to crisis and collapse, just as it did elsewhere in the Americas. Early in the twentieth century the signs of unhealthy growth appeared and led, step by step, to serious financial difficulties.

The Coffee Crises

The fazendeiros were well off in the period from 1885 to 1896. Land was cheap, the market for coffee was active, and profits were fabulous. Apparently the only problem was to secure enough labor. Coffee production crept ominously upward. In 1899 Brazil produced 9,000,000 bags, but in the next year the big plantings of the early 90's brought the production up to 11,000,000 bags. In 1901 it went up to 16,000,000.

In 1902 the state of São Paulo had about 530,000,000 trees of bearing age, and 135,000,000 more trees which had been planted since 1899 were about to come into production. The stage was set for disaster.

The first major crisis was postponed by two things. In 1902 the government prohibited new plantings for a period of five years, and there were severe frosts in the zone of the Sorocabana. But the relief was only temporary; in 1906, at a time when the whole world was consuming 12,000,000 bags of coffee a year, the Brazilian crop was 20,000,000 bags.

This same year the government adopted a system of *valorization* providing that a quantity of coffee should be purchased by the state or federal government and stored till the market was ready to absorb it. Since the coffee market is a relatively inelastic one, and coffee itself can be stored for many years without deterioration, there probably would have been no good effect from the government's policy were it not for the fact that years of big coffee harvests are almost always followed by years of small ones. Moreover, the government extended the prohibition of planting to 1912. As a result of small harvests between 1909 and 1912, and the prohibition of planting, the government was able to sell the stored coffee and thus to liquidate its investment.

In 1917, however, another huge harvest made a second valorization scheme necessary. In 1918 severe cold greatly reduced the coffee harvest —and even killed banana plants as far north as Limeira. The government again was able to sell the coffee it had bought, and succeeding years of low yields even made it possible for the government to realize a profit.

In 1924, however, a policy of permanent coffee defense was adopted, but it was not accompanied by any real effort to control the rate of new coffee planting. Merrily the planters pushed forward, aided by the big immigration of the decade after 1918. In 1928 Brazil had a crop of 26,000,000 bags, and in 1930 of 28,200,000 bags. The resources of the government were at an end and the world had already plunged into depression. In March, 1929, the price of coffee was 24.8 cents a pound, but in October, 1931, it had dropped to 7.6 cents. The collapse of the financial structure brought with it political revolution. In October, 1930, a successful revolution brought President Getulio Vargas into power, and the era of the first Brazilian republic (1889–1930), which was associated with the rise of coffee in São Paulo State, came to an end.

The coffee problem since 1930 has not been a simple one. The huge plantings of the '20's little by little came to bearing age. The average annual harvest between 1922 and 1926 was a little under 14,000,000 bags; the average of the period from 1932 to 1936 was nearly 22,000,000 bags.

Meanwhile Colombia and Venezuela benefited from the price controls instituted by Brazil and were able to sell larger quantities of their coffee than formerly. Between 1931 and 1937 Brazil destroyed nearly 48,000,000 bags of coffee by dumping them into the ocean or burning them. The year 1930 may well prove to have marked the end of an era.

Changes in Land Tenure

One result of the change that has taken place in São Paulo State is the rapid increase in the number of small properties, that is, of farms of less than 150 acres. Units of this size were not lacking before, and many Brazilians recognized the desirability, for the good of the workers, of establishing peasant colonies on small farms; but as long as a sufficient number of the landowning class were deriving large incomes from the speculative system no change could be made.

Even as early as 1882 the government of São Paulo adopted a policy of helping immigrants establish themselves permanently on the land, and of breaking up the large estates. Colonies of immigrants were settled here and there on small properties sold to them either by the government or by private land companies with the blessing of the government. In some cases the large landowners formed colonies of their own, dividing portions of their estates into small lots which they would sell to immigrants. Their purpose was to keep a source of day laborers near by to be used when pressure of work demanded. Unfortunately, in spite of these attempts, about 48 per cent of the immigrants to the state later returned to their own countries and of those who did not leave few remained permanently in farming. Only about half the Portuguese and Italian immigrants remained as farmers; the others went as soon as possible into the cities. Only the Japanese and some of the peoples from Eastern Europe have remained in the rural areas.

The number of peasant colonies has increased rapidly in the last decade. For the first time it was definitely more profitable for the large landowners to sell their estates in small pieces. No small part of the investment in buildings and industries in São Paulo city came from landowners who had removed their capital from the production of coffee. But the former coffee estates were not turned over to pasture, as was so common in the Southeast; they were subdivided and quickly occupied by former tenants to whom a somewhat greater measure of prosperity had belatedly come.

Several parts of São Paulo State today show marked concentrations of land occupied by small holders. Perhaps the largest concentration is in

the inner lowland, which has long been avoided by coffee growers. The zone of largest concentration extends well into the northwest along the line of the Paulista, but the density of population is greatest in the triangle bordered by Campinas, Sorocaba, and Piracicaba. The people are engaged in "mixed farming"—which is not a characteristic of Brazil as a whole—for in addition to some coffee they raise sugar cane, cotton, and oranges. The phrase "mixed farming" is not wholly an accurate one, for sugar cane is grown more around Piracicaba than elsewhere, as are cotton around Sorocaba and oranges along the Paulista (Maps 91, 93, and 97). Along the alluvial lowland of the coast, near Santos, recent years have witnessed the rapid spread of banana cultivation. In 1925 this district was producing some three to four million bunches a year; but in 1937 the production reached eleven million bunches.

From 1918 to 1935 many Japanese came to Brazil, and some of the Japanese colonies today offer striking examples of effective settlement by small farmers. The land company known as the *Kaigai Kogyo Kabushiki Kaisha*, under the direction of the São Paulo government, has established many thousands of Japanese immigrants on their own little sixty-acre farms. Today, of the 193,000 Japanese estimated to be in Brazil, 130,000 are in São Paulo State, forming about 2 per cent of the population. There are many Japanese settlements in the truck-farming area around the outskirts of São Paulo. A pure Japanese colony has been established in the warm, rainy valley of the Iguapé, in the Zone of the Escarpment. But the greater proportion of Japanese immigrants, wherever they may have gone originally, are now concentrated in certain parts of the western frontier.

The Zone of the Frontier

The pioneer movement which started when the coffee planters began clearing the forest around Campinas and which swept like a wave over São Paulo State did not come to an end with the collapse of the coffee boom in 1930. Since that date the frontier of agricultural settlement has advanced still farther toward the west, only the pioneers are now small farmers, not tenants working for large landowners. The majority of the pioneers come from the older zones of settlement in São Paulo State. Many different kinds of people are involved. As we have said, there are considerable numbers of Japanese, some of whom are new immigrants settled by the K. K. K. K. There are a few people from Baía and other parts of the Northeast who come to the frontier intending to return home

soon with their gains. There are very few new European immigrants. The great majority of the pioneers come from other parts of São Paulo with the result that there is a rapid depopulation and decadence of areas back of the frontier. So many tenants have left that even the coffee fazendas on the terra roxa lands have been obliged to omit certain of the cultivation practices, and to leave parts of the crop unharvested for want of workers. Not only have the tenants departed from the coffee estates; there has even been a considerable migration of peasant proprietors from the small farms on which they were supposedly fixed. Even the hard-working Japanese are caught in the scramble for quick profits. As the new frontier rolls westward through the wreckage of the forest it leaves behind it a land rapidly depopulated and abandoned. Today decadence is apparent in most parts of the old coffee zone, the result more of scarcity of workers than of low market prices (181).

Cotton and Coffee

Cotton rather than coffee is the crop which, since 1934, has brought about the great rush of pioneer settlement. The Paulista cotton is a short-staple variety which enters into direct competition with the product of the Cotton Belt of the United States. In 1932 there were only about 30,000 people in São Paulo State engaged in producing cotton, and fewer than 200,000 acres devoted to it. By 1935 the area used for cotton had jumped to more than 1,500,000 acres and 250,000 people were reported as cotton farmers. Around Marilia, coffee trees not yet of bearing age were pulled up to make room for the new boom crop. The whole procedure was strictly in the Brazilian tradition, but it was the Japanese pioneers who produced 46 per cent of the cotton of that year.

Cotton is not a new crop in São Paulo State. For many decades cotton and coffee have reacted to variations in price in much the same way as maize and wheat in the Argentine Humid Pampa. When the boll weevil invaded the Cotton Belt of the United States, or when acreages there were reduced by the government, the result was increased plantings in Brazil, especially in São Paulo. In years when frosts reduce the coffee crop, the losses are in part offset by large cotton yields. Each time the cotton crop tends to increase, some of the people in São Paulo speak of new diversification of crops in this one-crop region and of the coming stability of agriculture. Then cotton production declines and the planting of coffee goes forward again unchecked.

Unfortunately, however, cotton is not a crop which can be combined

with coffee in a stable and harmonious agricultural economy. Both crops require a large labor supply and for both of them the harvest season, with its peak of labor demand, comes at the same time of the year. The cotton farmers of São Paulo who sell to foreign markets are what the economist calls "marginal producers"; that is, their product comes on the market only to make up a deficiency of supply and they quickly drop out when the supply from other less expensive sources is ample. Because of the relatively small investment and the temporary nature of Paulista agriculture, this shift in and out of production is accompanied by little disaster and little dislocation.

Since 1933 São Paulo State has grown from a third to nearly a half of all the cotton produced in Brazil, and since 1936 cotton has occupied second place in the crop acreages of the state. From 50 to 75 per cent of the plantings in São Paulo were located on the western frontier; but in the older parts of the state there was also considerable cotton planting. On many of the small farms maize, rice, and beans were replaced by cotton. In the midst of the coffee fazendas, even of the rich Ribeirão Preto district, cotton was planted in the valleys.

Whether the cotton boom has come to an end or not cannot be said yet, but a new boom has already started in São Paulo as it has in the Southeast. There has been a marked falling off in demand for Brazilian cotton since Japanese purchases began to decline in 1938 and especially since the outbreak of the Second World War. However, by 1938 another speculative wave had begun to move over São Paulo. The planting of oranges came to occupy more and more the attention of Paulista farmers, whose interest in cotton was waning. Orange cultivation was concentrated in the Paraíba Valley, and along the line of the Paulista Railway between Campinas and Limeira (Map 93). The trees were set out in vertical rows, crowded as close together as possible in order to bring the maximum profit per acre. Little attention was paid to soil conservation in the planting. It is still too early to say that oranges will replace cotton permanently and to specify what their relations to coffee will be.

The Paraná Colonies

The Rio Paranapanema marks the southern boundary of São Paulo State (Map 91). Just south of this river, in northwestern Paraná, is Brazil's latest zone of pioneer settlement, the Paraná colonies (Map 93). Northwestern Paraná possesses advantages for pioneer settlement which may make possible a much more stable form of land use than is to be

found on the frontiers of São Paulo State. The advantages are inherent in the land itself. The surface is made up of broad, gently rounded interfluves and valleys with slopes gentle enough to be used for crops. The Rio Paranapanema has cut a deep gorge far eastward into the plateau. Its southern tributaries have also taken deep bites out of the plateau as they have cut headward into Paraná, but the upper parts of these tributary valleys still have rather gentle slopes. Between the tributary valleys on the southern side of the Paranapanema, the broad interfluves extend fingerlike toward the northwest. Except for a few patches where sandy soils are found, most of the area is covered with terra roxa (Map 6). The whole district lies within the zone of transition between land with frost every year and land with no frost. In the deep valley of the Paranapanema there is malaria, but the district of the colonies is high enough to be free from it. The original forest consisted mostly of broadleaf, semideciduous woods, with a mixture of Araucaria pine in areas subject to frosts. The physical characteristics of the land proved to be remarkably favorable for the kind of settlement which was attempted.

Shortly before 1930 the coffee frontier was just beginning to cross the Paranapanema into northern Paraná (Map 96). The uncleared woodland in advance of the zone of settlement, as in São Paulo State, was divided in large properties, although the only inhabitants of the land were scattered groups of Indians and half breeds, chiefly near the Rio Paraná. A British land company combined several large properties by purchase, and proceeded to make a survey of the land. The *Companhia de Terras Norte do Paraná* planned the settlement of this area in 1931, before the first clearing was made in the virgin forest. The railroad and the main and secondary roads were laid out along the ridges and the towns were located at intervals suitable to the proposed economy. Rural lots were given narrow frontages along the ridge-top roads, and were extended in strips down to the streams on both sides. When the settlers purchased their lots, they agreed, according to the law of Paraná, to leave at least 10 per cent of their land in forest—a very important regulation both for conserving valuable timber and for protecting the steeper slopes from soil erosion. Instead of the haphazard and irregular pattern of settlement characteristic of the frontier in São Paulo State, the Paraná colonies show all the effects of careful planning.

The movement of settlers into the Paraná colonies was rapid. In 1937 there were 29,000 people in the area, of whom 19,000 were farmers. Already Londrina, the chief town of the district and only about five years old, had a population of nearly 10,000.

In spite of the differences which set off the Paraná colonies from the pioneer zone of São Paulo State, the district is essentially a part of the São Paulo region. The main source of its colonists is São Paulo; its chief connections are with the city of São Paulo by way of the Sorocabana; its closest contacts, as indicated by business offices and newspaper circulation, are with São Paulo rather than Curitiba, the capital of Paraná.

The northwestern part of Paraná probably would have proved unsuited to the traditional fazenda paulista, with its vast acreages of one crop. Where the land is so irregularly spotted with places subject every winter to frosts it would have been impossible to plant coffee exclusively, even on the ridges. Yet the small proprietor in this district has the advantage over the colonists farther south in Paraná—in that many small frost-free areas give him an opportunity to share in the big profits to be derived from tropical crops. If all the land could be used for such crops, speculation in coffee and cotton might have predominated, as it has north of the Paranapanema. In the Paraná colonies stability is gained through a most unusual mixture of crops. On the warmer north-facing slopes, the farmers grow coffee, cotton, oranges, pineapples, and even sugar cane. On the south-facing slopes or in the valley bottoms where frost accumulates each winter—spots which are marked by the presence of the pines—the farmers raise wheat, barley, maize, potatoes, and other typically midlatitude crops. A considerable part of the production of the colonies consists in the fattening of hogs on maize—that familiar, stable, but unspectacular agricultural system known in the United States as the "corn-hog economy."

THE SERTÕES

The frontiers of close settlement on the west and north of the São Paulo region are very irregular. In the west of São Paulo State and Paraná clearings are being advanced along the railroad lines toward the Rio Paraná, but only along the line of the Sorocabana have they actually reached that river. Elsewhere unoccupied virgin forest lies between the river and the first outposts of the coffee or cotton planters. The more accessible forests are being utilized for their valuable cabinet woods, which, when shipped to São Paulo, provide the raw material for an important furniture business. In the more remote forests, only a very small population of Indians and people of mixed ancestry practice a kind of shifting cultivation which makes little permanent impression on the land. In the north, the frontier of close settlement has reached the south-

ern bank of the Rio Grande on the border between São Paulo and Minas Gerais. Beyond these frontiers are the sertões (Map 94).

The sertões beyond the São Paulo frontier were first penetrated more than three centuries ago by bandeirantes. Restlessly searching for sources of wealth, the explorers pushed far to the north and west. They followed the Tieté Valley through the belt of forest in western São Paulo and crossed the highlands of southern Mato Grosso to the Rio Paraguay. In 1719, shortly after the discovery of gold in Minas Gerais, they found gold-bearing gravels in the vicinity of Cuiabá, on one of the headwater tributaries of the Paraguay. In many scattered places between Cuiabá and Goiaz, gold and diamonds were both found in small quantities. To Cuiabá came many gold seekers with Negro slaves whose descendants today form a large portion of the population of the sertões of that district (Map 2). The chief use which the bandeirantes and their descendants made of the sertões, however, was for the grazing of cattle. In the course of time the better areas were divided into huge estates with vague boundaries over which cattle ranged, with a minimum of care required.

The roads to the sertão, like all the roads developed by the Portuguese, seldom were turned aside from the most direct routes by steep slopes, but they were turned aside by dense forest. The semideciduous forest along the eastern side of the Rio Paraná proved to be so great a barrier to roads between the sertões of southern Mato Grosso and the town of São Paulo that long detours around the northern end of the forested area were necessary (Map 92). Convoys of cattle and mule and oxcart loads of mineral products returned to São Paulo by way of western Minas Gerais. The lines of travel not only from southern Mato Grosso, but also from distant Cuiabá, skirted the northern end of the woods on the way to that part of the state of Minas Gerais which is known as the Triangulo (Map 91). Into this part of Minas, too, came the road from Goiaz. The routes from all the sertões of the north and west came to a focus on the town of Uberaba, whence a well-traveled course could be followed southward to Campinas and São Paulo. It was over this same course that the coffee frontier moved northward into the interior.

The development of railways and highways has brought a rearrangement of routes and of the means of transportation by which São Paulo is connected with its farther hinterland. During the last two decades railroads have been extended far to the west and north. From the end of the Mogyana system, the railroad was built into the southern part of Goiaz. From Baurú the Noroeste Railroad was built through the forest to the Paraná, and thence by way of Tres Lagôas and Campo Grande

to the eastern bank of the Paraguay (Maps 48 and 50). Transportation on these new railroads was much faster than by oxcarts, but long single-track lines, passing through sparsely populated country, are very difficult and costly to operate. Goods are reported to have taken three weeks in transit from the end of the railroad in Goiaz to São Paulo. Now the railroad has an uncompromising competitor in the motor trucks—mostly Fords and Chevrolets—for which passable roads now extend far into the interior beyond the railroads. From Goiaz a motor truck can make the trip all the way to São Paulo in from four to six days. Airplanes, too, have reduced to hours many of the journeys which not so long ago were measured in weeks or months (159). With these closer connections to the metropolis, many Brazilians are now pointing to the sertões beyond the state boundary as a new "Far West," a new area of potential pioneer colonization.

Unfortunately too little is really known about the nature of the land in this new "Far West" to make possible the effective planning of such a pioneer movement, even if the necessary people could be found to undertake a westward migration. Climatic stations are widely scattered, and although the whole area seems to be adequately supplied with rainfall, there is little information regarding seasonal irregularities, nor is there sufficient information concerning the soils and the availability of water underground. Nevertheless the region can be described in general terms.

The Sertão of Southern Mato Grosso

A remarkably sharp contrast in vegetation is found along the Rio Paraná (Maps 7 and 92). On the São Paulo side the dense forests cover all the west-facing slopes of the tableland; but on the other bank the scrub forests and the grasslands appear, a sharp vegetation change which has yet to be explained.

Three kinds of vegetation are found in crossing Mato Grosso between the Paraná and the Paraguay. In the east and extending as far west as Campo Grande (Maps 48 and 49) is a type of vegetation which the Brazilians call *campo cerrado,*—a savanna with scattered thickets of deciduous scrub forest (Map 7). Further investigation of the region may show that the various kinds of grass-forest mixture have an important bearing on the physical quality of the land and its potential value for agricultural settlement. The designation of the vegetation as campo cerrado has the unfortunate effect of masking under a cloak of seeming uniformity a

pattern of distribution which is, in reality, quite varied. For example, the terra roxa occurs in many places under this cover of vegetation, being especially prominent around Campo Grande, where its distinctive red coloring stains not only roads and buildings, but also even the animals and the people.

Immediately west of Campo Grande one encounters the second vegetation type of Mato Grosso—the pure grasslands, or *campo limpo* (Map 49). The treeless country runs in a narrow band southward from the Noroeste Railroad to the border of Paraguay; it follows the high country of the drainage divide between the tributaries of the Paraná and those of the Paraguay. Only in the ravines which have been cut back into the divide can surface water be found, and here there are little patches of forest.

Both the campo limpo and the campo cerrado are utilized for the grazing of cattle. The pure grasslands offer especially good pasturage except for the difficulty of finding surface water. Only in the rainy season (summer) can the herds remain on the high country; in the dry season (winter) they are driven farther to the east. On the large cattle ranches, which average as much as 5,000 acres each, the animals receive little attention from the small seminomadic population of herders. The permanent rural settlements are found only at ranch headquarters. For the whole district Campo Grande has become the leading commercial town, a position achieved first when the Noroeste gave it rail connection to the east.

The campo limpo is terminated sharply on the west by a west-facing line of cliffs (Map 48). The top and the steep front of this cuesta, as well as the valleys which have been cut back into it, are heavily forested (Map 49). Between the base of the cuesta and the Rio Paraguay the vegetation is again savanna. The country, however, is a floodplain. Areas which are flooded seasonally are either grassy or are covered with tall evergreen trees; only on the hills which stand above flood-level is the deciduous scrub forest to be found. The wet lands are called *pantanal* by Brazilians.

On the higher ground at the base of the cuesta above the floods a string of old cattle estates, established during the eighteenth century, have their headquarters. The animals graze on the wet savannas during the dry season and seek refuge on the higher ground when the floods come. Except for its isolation, this district is reputed to be among the best of Brazil's tropical grazing lands.

Only recently has the Paraguay Lowland been made directly accessible

to the rest of Brazil. During the first three quarters of the nineteenth century the use of the Paraguay for navigation was discouraged by the unfriendly policies of the dictators of Paraguay. After the Paraguayan War, however, the river was opened to international commerce, and small river boats began to make regular trips to this remote western part of Brazil. Corumbá was established originally as a defense post where a line of crystalline hills cross the lowland and offer a site for strong fortifications. When the river was opened to international traffic, Corumbá's importance was increased because it was the head of navigation for the river boats which ascended from Buenos Aires and Asunción. Rubber, gold, ipecac, hides, and skins, from farther up the Paraguay or from the lowlands nearby, were gathered on the waterfront of Corumbá for shipment downstream.

The Noroeste has not yet reached Corumbá; a ten-hour boat trip connects the town with the end of the railroad. But plans have been laid for the extension of the Noroeste across the Chaco to the Bolivian oil fields around Santa Cruz; if these plans are carried out, Corumbá's future as the strategic center of the Brazilian Chaco would seem to be assured. Already it has become the junction of air routes; regular passenger service connects it not only with São Paulo city, but also with La Paz in Bolivia, and a weekly service is maintained to Cuiabá.

The Sertão of the Triangulo and Goiaz

São Paulo has also extended its connections by rail and motor road northward into the Triangulo of Minas Gerais, and beyond into Goiaz. All of this region is covered with campo cerrado. In part because of its position at the focus of the routes from the more distant regions, the Triangulo has the largest herds of cattle, the densest population, and the largest number of small settlements of any section of the pastoral sertões in the hinterland of São Paulo (Map 94). The herds have been greatly benefited by the introduction of zebu stock and the crossing of these hardy animals with the native cattle. Around the larger towns, like Uberaba and Uberlandia, there are scattered areas devoted to maize, manioc, rice, beans, and sugar cane. In recent years, too, there has been in southeastern Goiaz a significant increase in the planting of tobacco for export.

The distribution of people in the sertão of the Triangulo and Goiaz is being changed with the construction of the railroad in much the same way that population changes accompanied the extension of the Central

to Pirapora. At each new railhead a town springs up, and people are attracted from the many scattered settlements nearby. The growth of each railhead town is thus accompanied by the depopulation of the surrounding country. At present the railhead is at Anápolis, near the drainage divide between the Paraná and the Amazon.

On a high plateau forty miles west of Anápolis is Goiânia, the new state capital of Goiaz. In the midst of the sertão one comes upon a modern well-planned city, for Goiânia, like Belo Horizonte, was created in the wilderness. The old fever-ridden town of Goiaz, on low ground not far away, has now been virtually abandoned in favor of the new capital, which embodies some of the most up-to-date ideas of city-planners.

The vast depopulated areas and the surprising modern cities of the sertão deep in the heart of Brazil have come about with the extension of the railroad into the wilderness. Cattle are still, as they always have been, the chief source of wealth, but in the sertão they cannot be fattened. They are grazed far and wide there and then driven south to Barretos in São Paulo, near the end of the Paulista, or to Uberaba in the Triangulo (Maps 91 and 93). There the animals are fattened on the native grasses, which are especially nourishing in the northern part of São Paulo. Later they are shipped to São Paulo city for slaughter.

São Paulo city is the focus of all the varied activities of the sertão. Even more than Rio de Janeiro, this other city of over a million inhabitants is in a position to act as the hub of a great inland tributary area. Not only because of its energetic and economically advanced people, but also because of the ease with which the lines of communication can be brought to a focus on this state and this city, São Paulo is bringing the distant sertões more and more firmly into its sphere of influence. The more varied the activities which are carried on both in the immediate hinterland and farther out, the more stable will be the urban center. The development of a real westward movement, not a new wave of speculative exploitation leading to a further advance of the hollow frontier, should be of major interest to the urban people of the nucleus.

Nevertheless, speculative gain continues to be the ruling force in the economic life of this most progressive region. Lack of permanence remains a fundamental characteristic of the relation of the people to the land. Still the lure of big profits from virgin soils tears people away from lands already occupied, even from those areas which are physically capable of much more intensive development. In the absence of more

abundant capital in a land of generally insufficient population, and in the face of an abundance of unused resources, no approach toward stability seems to be possible. Now even the city itself is seized upon for speculative gain, just as other people in other lands have sought big profits from growing urban communities; the newest device imported from abroad to wring still greater profit from the land is the skyscraper.

The net growth per thousand per year is 23.9 among the small farmers of this part of Brazil—a rate which in all Latin America, outside of the West Indies, is probably exceeded only in Guatemala and in Antioquia, and equalled only in Costa Rica.

That the colonists in southern Brazil should have developed this kind of settlement and have created frontiers which are not hollow is a matter of great importance not only for the Brazilian nation, but also for students of the distribution of people in Latin America. Why should the South rather than any other part of Brazil have been occupied by people capable of establishing stable patterns of settlement and of supporting frontiers of new settlement without loss of population in the center? Will the answer to this question suggest the reasons for the lack of such expanding settlements elsewhere? It is best not to accept any one simple explanation; we shall find that in this problem as in others the interpretation of social phenomena involves the interplay of many complex factors, racial, social, economic, and political, and all these factors must be examined historically and geographically.

THE LAND

To what extent is the character of the land itself responsible for this contrast between the South and the other regions of concentrated settlement in Brazil? In any attempt by mankind to occupy any part of the earth for a long period of time it is a prime necessity that a workable connection be made between the methods of gaining a living and the resources of the land. A connection cannot be said to be permanently workable if it is a destructive one, and if it leads, therefore, to the decline of population or to the impoverishment of the people. Any attempt to interpret the arrangement of people without reference to the character of the land on which they live is incomplete. Let us, therefore, see what significant changes take place in the physical quality of the region south of the border of São Paulo as compared with the lands to the north of it.

Surface Features

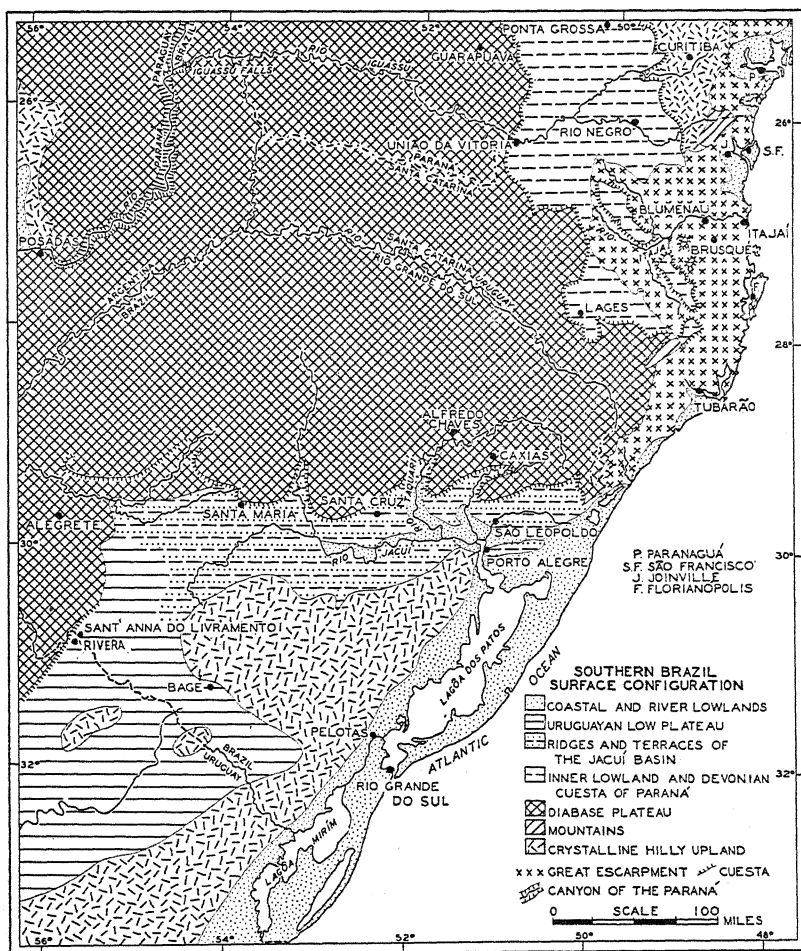
As far as surface features are concerned we find very similar country north and south of the border of São Paulo. The same fundamental elements are to be found. There are the coastal zone and the Great Escarpment. Inland, the crystalline hilly uplands appear, surmounted in a few places by low mountains. Further on are the inner lowlands, the east-

facing cuestas, and the tablelands of the Paraná Plateau sloping gently westward. The arrangement of these elements, however, differs in detail.

The Great Escarpment is a commanding feature of the region as far south as Porto Alegre (Maps 98 and 99). In Paraná between the port of Paranaguá and the highland city of Curitiba, the Escarpment forms one single slope, as it does back of Santos in São Paulo State. Almost exactly on the southern border of Paraná, however, the Escarpment is broken into a wide zone of faulted blocks, forming a great angular re-entrant in the state of Santa Catarina. Within this Zone of the Escarpment the terrain is very rugged—composed of angular block mountains separated by rift valleys formed along the dominant fault trends. Only near the coast do the valleys widen to produce narrow swampy lowlands; and even there the lowlands are separated by mountain ridges which extend seaward as cliffed promontories. South of latitude 28° S. the Escarpment again approaches the coast, although it remains, as far as its southern end, bordered by a narrow zone of down-faulted blocks. The edge of the unbroken Paraná Plateau which dominates the Escarpment from the west is known to the Brazilians as the *Serra Geral.*

Above the Great Escarpment the various surface elements described in São Paulo continue into Paraná (Maps 6, 91, 98, and 99). The crystalline hilly upland has the same general character, although south of the Paulista border it is surmounted by only two small ranges of mountains. One important difference appears in the inner lowland: in Paraná and the neighboring portions of São Paulo and Santa Catarina, the rock stratum which rests immediately on the crystallines is a sandstone of Devonian age. Unlike the formations which border the crystallines in most of the São Paulo region, this sandstone is very resistant, and so forms another cuesta which stands abruptly above the general level of the granites and gneisses, and slopes gently westward into the inner lowland. This we shall call the *Devonian cuesta.* The western margin of the inner lowland is drawn along the front of the diabase cuesta.

All these various features—crystalline upland, inner lowland, and east-facing cuestas—trend in a great semicircle far to the west as they cross Paraná. This westward bend extends from the latitude of Sorocaba in São Paulo to the central part of Santa Catarina. Persons familiar with geological maps will recognize evidence here of a structural dome, from which the cover of younger strata has been stripped back leaving the ancient crystalline rocks exposed in the center. The city of Curitiba is situated roughly at the apex of the dome, in the midst of a wide area of hilly upland about three thousand feet above sea level.

In the central part of Santa Catarina, where these various structures and associated landforms trend back toward the coast, they are cut sharply across by the Great Escarpment. The northern part of the re-entrant cuts off the inner lowland almost at right angles. At the innermost angle

Map 98

of the re-entrant, however, the diabase cuesta reaches the edge of the Escarpment, and from that point southward into Rio Grande do Sul these two features are united. In the very well defined Serra Geral of southern Santa Catarina and northern Rio Grande do Sul, the diabase cuesta caps the crest of the Great Escarpment. In the southern part of the Zone of

the Escarpment in the Santa Catarina re-entrant several of the more prominent detached blocks are capped with the diabase.

Half way across the state of Rio Grande do Sul the character of the surface changes radically. The Great Escarpment, which has its northernmost end near Salvador in Baía, reaches its southernmost end near Porto Alegre in Rio Grande do Sul, a little north of latitude 30° S. The diabase cuesta, however, turns inland, and extends almost east and west across the state. Lower patches of the diabase appear in the southwest of Rio Grande do Sul, and cross the border into Uruguay where they form the notably tabular landforms of the northwestern part of that country (Map 6).

This great westward bend of the diabase cuesta is the result of the presence of another structural dome, but one which lies at a much lower elevation than the dome in Paraná. The crystallines appear in the center, forming a wide area of hilly upland in southern Rio Grande do Sul, but at a general elevation of only about a thousand to fifteen hundred feet. The formations which produce the inner lowland in Paraná also form a lowland in Rio Grande do Sul. This is the Jacuí Basin, a belt of low east-west ridges and terraces lying between the crystallines on the south, and the front of the diabase cuesta to the north. The cuesta itself is sharply cliffed at its crest where the layers of diabase appear; but its lower slopes, which are gentler and more rounded than the crest, are formed on layers of red sandstone. The whole cuesta is cut by tributaries of the Rio Jacuí which drains the lowland between the cuesta and the crystalline upland.

The coast of this southern part of Brazil is rocky and precipitous only in the middle part between São Francisco and Tubarão (Map 98). The alluvial lowland of southwestern São Paulo continues southward to form the swampy, flat country around Paranaguá and São Francisco. Itajaí and Florianópolis, on the contrary, are located in the midst of hilly country—Florianópolis on the western side of a block mountain which is essentially a part of the Zone of the Escarpment but which has been separated from the mainland by the sinking of the coast. South of Tubarão, and extending into Uruguay almost to Montevideo, the hilly land of the interior is fringed by a wide coastal zone of alternating sand bars and lagoons, with many sand dunes. The largest of the lagoons are the Lagôa dos Patos into which drains the Rio Jacuí and the Lagôa Mirím.

The most important difference in the surface features of the South as compared with those of São Paulo is the much greater area of diabase

SOUTHERN BRAZIL
Diabase plateau
Inner lowland on bedded rocks
Great Escarpment
Crystalline hills
Plains are left blank
Miles
Kilometers
Spot heights in meters
ARGENTINA
URUGUAY
Rio Iguassú
Rio Uruguay
Rio Jacui
Lagôa dos Patos
Ponta Grossa
Curitiba
Paranaguá
Joinville
São Francisco
Itajaí
Blumenau
Florianópolis
Lages
Tubarão
Caxias
Santa Maria
Cachoeiro
Porto Alegre
Bage
Pelotas
Rio Grande do Sul
Raisz

Map 99

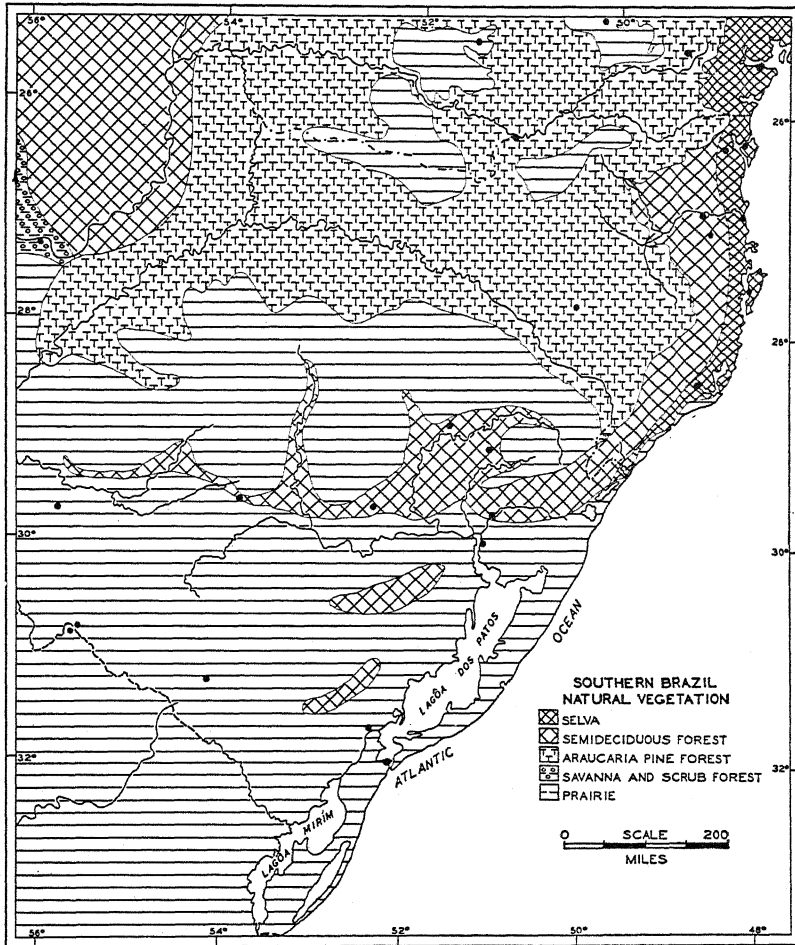
and of the resulting terra roxa (Map 6). The diabase underlies much of western São Paulo, but only along the crest of the cuesta or in the deeper valleys is it not covered by layers of sandstone. In Paraná, Santa Catarina, and northern Rio Grande do Sul the diabase is exposed at the surface over all the territory west of the cuesta, even extending across the border into Argentina and Paraguay. This is one of the world's largest lava plateaus. The Rio Paraná and its tributaries have cut deep canyons back into the resistant diabase, and at the heads of these canyons are some of the world's most spectacular waterfalls. The Guayra Falls on the Paraná, known in Brazil as the Falls of *Sete Quedas*, are located at the northeast corner of Paraguay (Map 48). Better known are the Iguassú Falls, produced where the Rio Iguassú, on the border of Brazil and Argentina, tumbles over the edge of the diabase into the Paraná Canyon. The falls on the Rio Uruguay are smaller, and are scattered along the course of the river downstream to he Uruguayan town of Salto.

The varied geological structure of the South of Brazil permits the existence of many different kinds of mineral resources. In the crystalline area of Rio Grande do Sul, for instance, there is copper; in Santa Catarina and Paraná there are small sources of high quality iron ores; and among the sedimentary strata which lie between the crystallines and the diabase there are seams of coal. The coal is thick enough to be mined at two places—at São Jerônimo in Rio Grande do Sul, and inland from Tubarão in southern Santa Catarina (Map 101).

Climate and Vegetation

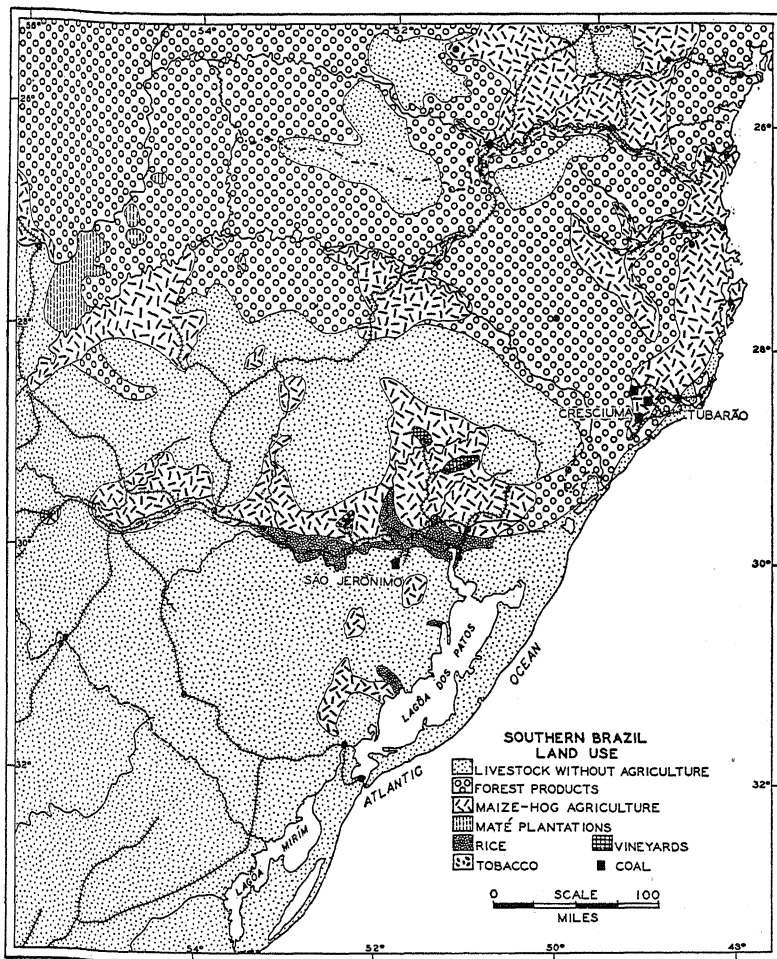
Some of the climatic and vegetation contrasts along the southern border of São Paulo on the highlands have already been described. The northern limit of frosts, revealed by the arrangement of the pine forests, is a line of great significance. Frosts, however, are limited to the highlands and are never experienced either in the deep valley of the Paraná or along the coast. Frosts occur rarely in the valley of the Jacuí in Rio Grande do Sul. Of similar importance is the change in southern São Paulo from the tropical rainfall regimen marked by dry winters to the regimen of abundant rains in all months, characteristic of the South.

From Sorocaba southward on the highlands, the vegetation cover undergoes a gradual change from tropical semideciduous forest to pure grass prairie. The semideciduous forest extends far southward in the deep valley of the Paraná, but is replaced at higher elevations by the frost-resistant pine forests. The prairies which occur in patches throughout

southern São Paulo, Paraná, and Santa Catarina become more extensive than the forests in Rio Grande do Sul south of the Uruguay Valley. This is a region of plentiful rainfall, in which the prevalence of grass instead of forest has never been adequately explained.

Map 100

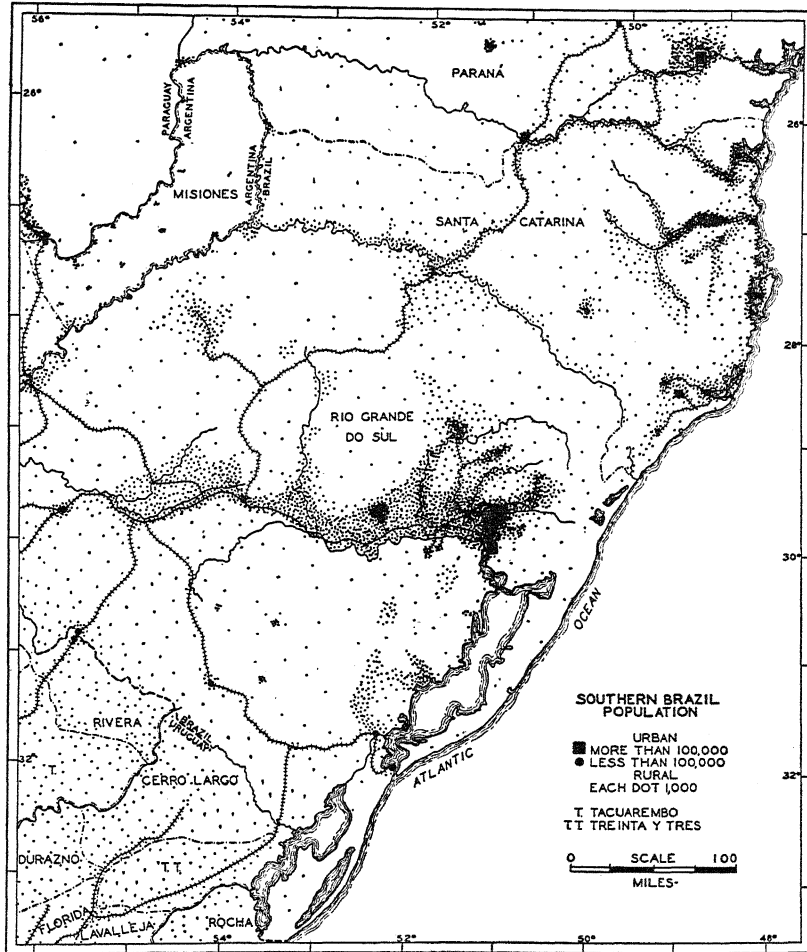
The details of forest-grassland distribution in this broad zone of transition are closely related to the underlying rock formations. The Devonian cuesta, for instance, presents a landscape which is almost completely devoid of trees except for the little forest patches at the ravine heads where springs occur. Much of the inner lowland is grass-covered. The diabase and the crystallines become less and less forested as one proceeds

southward. "Predominant grasslands with ravine-head forest patches" describes the vegetation of the diabase plateau in northern Rio Grande do Sul (191).

Contrasts of climate and vegetation along the coast are not so abrupt as on the highlands. The climatic conditions in summer show only

MAP 101

minor differences between Santos and Rio Grande do Sul. There are the same gray skies, the same heavy rainfall, the same high temperatures. The average temperature of the warmest month at Santos is 77.9°, at Blumenau, 75.9°, at Porto Alegre, 76.5°, and at Santa Maria, near the head of the Jacuí Valley, 76.8°. But the winters are definitely cooler in

the South. The coldest month at Santos averages 66.0°, at Blumenau, 58.3°; and at Porto Alegre, 56.3°.

The cooler winters are reflected in the vegetation cover by the gradual elimination of the tropical rain forest, and by the descent of the semideciduous forest from the higher part of the Escarpment almost to sea level.

Map 102

The rain forest, which forms a continuous screen of dense growth all the way southward from Baía, reaches its southern end a little north of latitude 30° S. It is replaced by the lighter semideciduous forest; and this forest also extends in a band along the south-facing slope of the highland far across Rio Grande do Sul.

Relation of the Population Clusters to the Physical Features

The relation of the clusters of people to these features of the surface, the climate, and the natural cover vegetation needs to be observed carefully (Map 102). In Paraná, as in São Paulo, the chief area of settlement is on the upland, in an area of crystalline hills; in each the coastal zone is well settled only in the vicinity of the port; and in each the chief urban center, the nucleus of the highland population cluster, is located above a place where the Great Escarpment forms a single slope. Farther south, in Santa Catarina and Rio Grande do Sul, the population clusters occupy the lowlands and valleys, and the highlands are sparsely settled. It should be noted that the winters of the South are cooler, although the possible effect of this on the activities of the inhabitants must be balanced by the fact that most of the agricultural work is done in summer under conditions of temperature and humidity which are scarcely to be distinguished from those of the coastal region farther north. The cooler winters reduce the activity of disease-carrying insects, although no part of Brazil is far enough south to extend beyond the limits of these insects. Frosts prohibit the planting of coffee except in northern Paraná, as previously described, but on the lowlands sugar cane can be raised, even in the Jacuí Valley of Rio Grande do Sul. These are the chief contrasts between São Paulo and the South which are inherent in the land itself.

SETTLEMENT OF THE SOUTH BEFORE 1822

Not until a historical study of settlement shows an actual causal connection between the facts concerning the land and the distribution of people can such a connection be asserted. To point out the relation between the lowland settlements and the cooler winters, or between the highland settlements and the places where the Great Escarpment forms one slope rather than a zone is not to establish any proof that this relationship was actually a motivating force in the minds of the settlers. For involved in this question are also the physical qualities, the psychological attitudes, the inherited traditions and taboos of the people, and all the countless accidents which play such an important part in the irrational course of human events.

Currents of Penetration

During the colonial period two groups of people entered the southern part of Brazil. One of these came southward along the highlands from

São Paulo. The bandeirantes, ill at ease in the heavily forested country, soon discovered the grassy prairies in the inner lowland south of Sorocaba, and followed them southward into Paraná. As early as 1680 an expedition had followed the grassland belt to the Banda Oriental and had founded, on the shores of the Plata opposite Buenos Aires, the town of Colonia, which the Portuguese called Sacramento. Before the middle of the seventeenth century the grasslands of Paraná had been divided into large cattle estates and animals from this sertão were being sent back to the markets of the Southeast. By the middle of the eighteenth century the open campos of Santa Catarina had been similarly occupied.

Meanwhile the bandeirantes had also been successful in the discovery of gold in this southern sertão. In 1654 a small source of precious metal was discovered in the stream gravels of the crystalline upland of Paraná and the little town of Curitiba was founded in the midst of the mining country by people who came overland from São Paulo.

The second group of people entering the south came from São Vicente near Santos and pushed southward along the coast. There were two chief objectives: the discovery of gold, and the protection of this southern part of Brazil from the Spaniards and the French. Small quantities of gold were found in the stream gravels of the coastal zone between Iguapé and Paranaguá; and to connect the new mining centers with São Vicente—a connection which was maintained by boat—the little ports of Iguapé and Paranaguá were established, the latter in 1654.

Both Paranaguá and Curitiba, therefore, were originally founded to serve small mining communities. One had its connections with São Paulo, the other with São Vicente; for more than a decade there was no connection between them. Contact was finally made in 1668, when the Portuguese crown granted a capitanía of all the lands "around Paranaguá." The new governor promptly extended his control over the highland mining community of Curitiba, and thereafter the two places were closely united. Not until railroads were built late in the nineteenth century did people discover that, from the point of view of easy grades, by far the best route from the coast to the plateau was from São Francisco and Joinville to Rio Negro in southern Paraná (Maps 98 and 101).

Meanwhile, southward penetration along the coast continued. Wherever the nature of the terrain seemed to offer special advantages for defense, forts and garrison towns were established, such as São Francisco and Florianópolis. Island sites were especially advantageous owing to the danger of attacks by the Indians who lurked in the dense forests of the mainland. Porto Alegre, on a ridge of high ground near the head of

the Lagôa dos Patos, faced the unobstructed prairie lands of the sout for which Spaniard and Portuguese were already competing.

Colonial Cattle Road

For the most part the two currents of settlement remained separat and distinct. The forest of the Zone of the Escarpment proved to be a much of a barrier to the people of the South as it had to those of the nortl The coastal fortresses made few connections with the land back of ther but the grasslands of the interior and of the south were quickly occupie by the cattlemen.

The chief connection of the southern sertões with the centers of Bra zilian colonial life was an overland trail. The annual fair at Sorocab attracted convoys of mules and cattle that traveled all the way from th Banda Oriental. Towns were established as supply stations along th way. The concentration of grazing animals in the grasslands of Paran and southern São Paulo must have rivaled that in the Triangulo of Mina Gerais around Uberaba.

Parts of this old colonial cattle road are still visible in the regior Over most of the route no evidences remain of the exact course of th road, if indeed there ever was a well-defined road through the grass prairies. But wherever the cattle had to pass through heavily woode valleys to cross a stream, they were forced to follow a narrow way. Ove the centuries that this route was followed, the feet of countless animal have cut paths on the valley slopes which have led to the formation c gullies. Where the old road crosses each valley today the slopes ar carved into miniature "badlands" with narrow ravines and knife-edg ridges. The present automobile road and the railroad follow approxi mately the line of this old trail, and from them the signs of the cattl days can still be seen.

On the whole the great southland remained a sertão, occupied at few points by military garrisons, and oriented economically towar Sorocaba. The people of São Paulo were much too poor to become suga planters, even where climatic conditions permitted. Furthermore, al though gold formed the basis of the original settlements in the crystal line area of Paraná and along the coast next to it, no such rich gold-bearin gravels were found here as in Minas Gerais. It was not a very valuabl country in the colonial period, and the Portuguese hold on it was not ver strong.

Principally with the idea of establishing a firmer grip on the souther border where wars with the Spaniards were very troublesome, the govern

ment of Portugal decided to populate the area with people who could be depended on to hold their lands, if necessary, by force of arms. A number of settlers from the Azores were introduced into the grasslands south of Porto Alegre. They were primarily soldiers and pastoral people, not agricultural colonists; they were selected for their ability to fight, not for any ability to labor. In the course of time most of the grassland area of Rio Grande do Sul was thinly occupied by a mixture of Portuguese of this type and of Spaniards.

POPULATION CLUSTER OF RIO GRANDE DO SUL

The creation of the present three distinct clusters of population in the South has been largely accomplished since the independence of Brazil. Of the three, as has been said, Rio Grande do Sul is the largest. It is therefore appropriate to discuss this state first and then to proceed in order northward to São Paulo with discussions of Santa Catarina and Paraná.

In 1822 the new Brazilian emperor Dom Pedro I recognized the necessity of getting a stronger hold on the South to guard against the threatened northward expansion of the Spaniards. In 1824, consequently, a group of German peasants, laborers, and craftsmen were brought over and settled in the new colony of São Leopoldo, located in the previously neglected forest lands a little north of Porto Alegre (Map 98). Between 1824 and 1859 more than 20,000 Germans were brought to Brazil with government aid, and placed on small farms in this region. Most of the German colonies were arranged in a kind of festoon along the terraces of the northern side of the Jacuí Valley and on the lower slopes of the cuesta where red sandstones form the underlying rock. They all began as clearings in the semideciduous forest, where such typical German crops as rye and potatoes were planted. Somewhat later maize was planted to be fed to hogs.

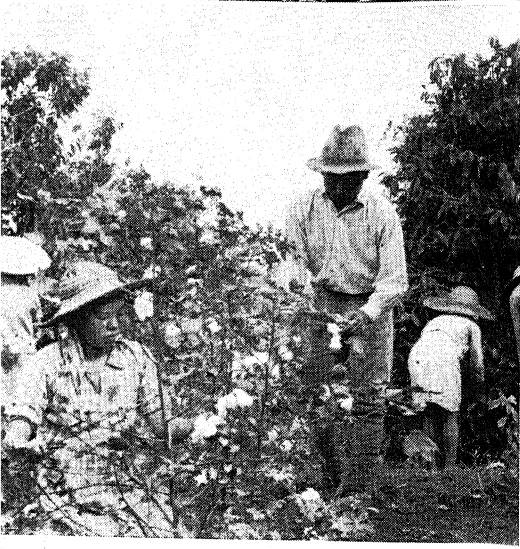
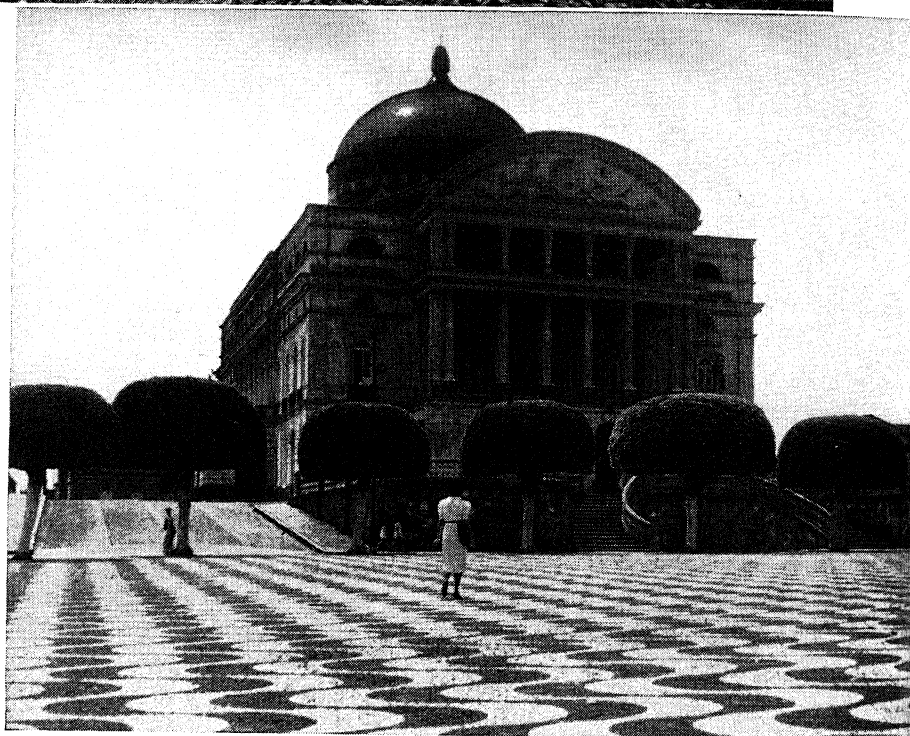
At first the conditions in the new colonies were bad. Only recently in Brazilian history has the construction of good all-weather roads to connect a zone of settlement with a market been widely recognized as a necessity, and even today in too many instances this necessity is overlooked. The establishment of colonies which are promptly lost in the sertão without a chance to sell surplus products and to buy such things as salt, oil, or clothing has seldom led to stability in settlement, whether in Brazil or in the United States or elsewhere. In the South of Brazil those colonies which were able to solve the problem of transportation were successful. The sad plight of the isolated pioneers of Rio Grande

do Sul was reported in Germany in 1859, and for a time further emigration to that region was prohibited. Little by little, however, the problem was solved, in part by connections with river ports along the Rio Taquarí or other tributaries of the Jacuí which gave access to Porto Alegre, and in part by the construction of the railroad westward from that city (Map 101). Land values were, and still are, determined more by the proximity of a piece of land to a line of transportation than by the quality of the land itself. Fortunately, Porto Alegre stands at the focus of what is perhaps the finest system of inland waterways in Brazil outside the Amazon.

Between 1870 and 1890, a new group of pioneers arrived in Rio Grande do Sul. These were the Italians, who came chiefly from the provinces of northern Italy. They settled on lands along the crest of the diabase cuesta, above the German settlements, but still in the belt of semideciduous forest. Alfredo Chaves and Caxias are the centers of the Italian colonization as São Leopoldo is the German center. Like the Germans, the Italians occupied small farms and built substantial homes, creating a landscape strikingly different from that of the Northeast, the Southeast, or São Paulo, where the habitations of the rural workers are only temporary, camplike structures. The houses of the European colonists are built of wood, and made in the architectural styles familiar in the homeland. As the Germans concentrated their attention on rye, maize, and hogs, so the Italian settlements could always be distinguished by the presence of vineyards.

Expansion of the Colonies

The most extraordinary feature of this zone of pioneer colonization, however, is its continued expansion. By 1859 a census indicated the presence in Rio Grande do Sul of 20,493 Germans. Two generations later, about 1909, there were no fewer than 200,000 people of German descent. During the whole period from 1824 to 1934, somewhat fewer than 85,000 immigrants from Germany came to Rio Grande do Sul; yet the population of German descent in that state numbers at present about 520,000, out of a total population of 3,100,000 (193 and 194).

The process of expansion reminds one of Antioquia in Colombia. Here was no hollow frontier; yet the very individuals who were found clearing the forests at the edge of settlement were again and again the same. As in the United States the people with the pioneer spirit, the unquenchable optimism of the frontier, could not endure the civilization they worked so hard to establish. They sold their properties, often with

The picture above shows a section of the Ford rubber plantation at Belterra. Here, in contrast with the early destructive exploitation of rubber in the Amazon region, scientific cultivation is in progress. (Courtesy of the Companhia Ford Industrial do Brasil.) Far above Belterra on the Amazon is Manaus, product of the early rubber period. In the lower picture one sees the great green dome studded with orange diamonds of the Manaus opera house — "a supreme monument to the poetic aspirations of a people intoxicated by a moment of easy wealth." (Photo by Francisco Silva, Jr.)

an increase of forty or fifty times the original value, and moved on, leaving the settlements to their less adventuresome sons and daughters (189). From São Leopoldo settlers advanced westward along the lower slopes of the diabase cuesta and on the terraces above the northern bank of the Jacuí, founding one after another the string of German settlements which reach now beyond Santa Maria. After the belt of woodland along the cuesta had been occupied, the German pioneers, together with other Europeans, entered the forests along the Rio Uruguay in the northwestern part of the state.

Although the forested parts of Rio Grande do Sul had originally been partitioned among a few landowners the landowners were only too glad to sell their land in small lots at reasonable prices, for they had been unable themselves to get such wealth from this region as the fazendeiros of São Paulo were getting from their properties. By 1909 there was scarcely a large estate left in the zone of the European settlements. As a result, the small farmers of the South, unlike those elsewhere in Brazil, were not forced to adapt themselves to a society already established; they were free to create their own society, which was essentially a rural democracy.

The Italian pioneers shared with the Germans an extraordinary biological vitality. Among the people who live today on the large pastoral estates of the South, the net growth of population is 6.9 per thousand; but among the colonists living on their own small properties, the net growth is 23.9 per thousand (7). This applies not only to the Germans but also to the Italians, and, in the regions farther north, to the Poles. The Italians, however, did not expand over as much territory as the Germans. There is a spirit of attachment to the family among these people that keeps several generations together, if not in the same home, at least near by. The young men have provided an important source of temporary laborers on the job of railroad construction and in the maté forests, but they always return home to add their wages to the family income. The result is an increasing density of population around the original colonial nucleuses.

Present Region of Settlement

The European colonists are credited in this part of Brazil with the creation of the vital spark of energy which, in the course of time, has produced a civilization out of the wilderness. The influence of these people in the whole life of this zone of settlement can scarcely be meas-

ured, for it goes far beyond mere numbers of citizens of European descent. Although the dominant theme of the region is Brazilian, it is a new kind of Brazil set off from the rest of the country by the presence of a considerable number of people who know how to engage in the hard physical work of pioneering in the forests and who are content with the relatively modest profits of an economy which is not speculative.

In the rural area back of Porto Alegre, four chief zones of settlements can now be discerned—zones which are highly contrasted in their populations and their forms of economic life, but zones which have now been brought to a distinct focus on Porto Alegre. The first of these zones is the oldest—the pastoral zone—which lies south of the Rio Jacüí and extends almost unbroken to the borders of both Uruguay and Argentina. In a few scattered spots in the forest just west of the Lagôa dos Patos there are a few districts of European agricultural settlement; but the vast area of prairie lands has never been seriously considered a farming country. It is used today as it was in the colonial period, although perhaps by a larger number of people. This is the domain of the gauchos, the herdsmen whose cattle and sheep roam the pastures of the large estates with a minimum of care. The herds are not of the new European breeds, such as those which have transformed the Humid Pampa of Argentina; they are descended from the scrub cattle of the colonial period, and they are marketed chiefly for hides, tallow, and for the production of *xarque* or salt beef which is bought by the poorer people throughout the cities of Brazil.

There has never been much development in Rio Grande do Sul, of that most productive mixture of stock raising and agriculture known as "mixed farming." The pastoral people and the farmers, here as in Argentina, are two different groups, whose attitude on life can scarcely be translated from one to the other. Whether these southern prairies can be utilized for the production of Brazil's supply of wheat depends more on the success of a campaign to transform the way of living of the gaucho than on the physical quality of the land. In the absence of detailed studies of soil and moisture, it would seem probable that, with an entirely different agricultural system, which probably means different people, the prairies of the South could be made to support a much denser population on the basis of a farm system not unlike that of parts of the North American Corn Belt.

The second zone in the rural background of Porto Alegre is the floodplain of the Rio Jacuí—especially of its northern tributary, the Rio Taquarí. Of the four zones, this is the most recent in origin, and is

occupied almost entirely by the so-called Luso-Brazilians, that is, Brazilians of Portuguese origin. Its one big product is rice, and the system of production is characteristically Brazilian. There are no public works controlling the water—no reservoirs, canals, drains, or other works built and maintained at public expense. Each owner must develop these things for himself. Unfortunately, unlike the rice district of the Paraíba Valley, the natural floods of the Jacuí system come at the wrong time of the year for rice, for the heaviest rains in this part of the South come in winter. Some of the estates have small reservoirs for storing the flood water until summer; others have small pumps to provide the necessary water for irrigation. Most of them depend on such moisture as is left over from winter floods. The system of land tenure, too, is the large estate with tenant workers. Yet this rice-growing district contributes an important part of the food supply for the people of Porto Alegre.

No contrast of settlement could be sharper than that drawn between the Luso-Brazilian rice area, and the German settlements on the terraces and cuesta slopes to the north which constitute the third zone. Not only are the villages strikingly different in their architecture, and the rural habitations obviously intended to be permanent homes, but also the care taken in the cultivation of the land, and in the embellishment of the natural landscape, informs one that here, at last, is a district in which the people intend to live permanently. Maize and hogs predominate among the farm products, but there are also rye and potatoes. Around Santa Cruz, too, has appeared one of Brazil's chief tobacco-growing districts. Rio Grande do Sul as a whole now produces about the same amount of tobacco as Baía, and the two together account for about 66 per cent of the Brazilian supply.

Still higher above the valley of the Jacuí is the fourth zone—the zone of the Italian colonies. Here again the character of the rural homes and of the villages is different, but if there is perhaps less of the German neatness, there is none the less an air of stability. From the many vineyards draped over the rounded hills of the front of the cuesta come more than 90 per cent of the grapes produced in Brazil, and a large part of the wines. These products do not enter into foreign markets, but they are able to compete with imported wines throughout Brazil especially for the use of the poorer people.

Porto Alegre

Industrial development during the last twenty years has made big advances throughout Rio Grande do Sul, especially in the city of Porto

Alegre. After São Paulo and Rio de Janeiro, Porto Alegre now has the largest industrial equipment. Its industries make use of the products of the agricultural and pastoral hinterland. Leather tanning is one of the oldest of the industries, for the German settlers long ago made a home occupation of the preparation of the hides they purchased from their neighbors, the gauchos. There are many textile factories manufacturing woolen yarn, and woolen cloth and garments. The sheep of the southwestern part of the state provide the raw material. In addition there are many breweries, and wineries, and other food-processing establishments scattered throughout the small towns of the farming area, or concentrated in larger units in Porto Alegre and Pelotas. Electric power is furnished by a North American company which makes use of the local supplies of coal.

Today Porto Alegre, which is the capital of Rio Grande do Sul, has a population of some 368,000. Built on a ridge of hills which reaches the left bank of the river, it is situated near the junction of five waterways, —the Lagôa dos Patos and four tributaries of the Jacuí which converge on the site from the northeast, north, and northwest. Many of the connections between Porto Alegre and its hinterland are by water. In addition, railroads now connect Porto Alegre with the Argentine lines at Uruguaiana (Map 48) and with the Uruguayan lines at Sant'Anna do Livramento (Map 101). The railroad center where these lines cross, and where the long overland connection northward to São Paulo begins its ascent of the diabase cuesta, is the growing town of Santa Maria.

The city of Porto Alegre is an inland center. It cannot be reached by ocean steamers, for the Lagôa dos Patos is too shallow to be navigated by any but shallow-draught boats. Two ports compete for the transshipment of the goods brought in and out of Rio Grande do Sul. One is the port of Rio Grande do Sul, located at the outlet of the river which drains the Lagõa dos Patos, and the other is Pelotas.

Coal

The industrial establishments of Porto Alegre, and to a certain extent those of the smaller communities of Rio Grande do Sul, derive most of their power from local supplies of coal. The smaller plants use coal to supplement wood, which is the prevailing fuel. But the coal mines are chiefly supported by the demand for coal in the capital city, both for power and for the production of gas.

There are two chief coal-mining districts in the South. The one which

is of chief importance in the supply of Porto Alegre is the district around São Jerônimo (Map 101), located in the open campos a short distance south of the Rio Jacuí. About a thousand people are clustered in this district, in which there are three mines. The mine workers are settled in a model community which would put to shame some of the mining villages of North America. The cost of transportation is low, for the haul by rail from São Jerônimo to the banks of the river is a short one, and the rest of the haul to the wharves of Porto Alegre is by river barge—one of the cheapest means of transportation.

The coal itself, however, is of distinctly low grade. It occurs in seams which vary greatly in thickness and contain narrow lenses of clay and much pyrite. As it comes from the mines, this coal contains as much as 40 per cent ash. When it is put through a washing process at the mine, the ash content can be lowered to between 20 and 30 per cent. Nevertheless, the impurities are so great that special types of equipment are required when the coal is used for heat or gas. Only in an inland city like Porto Alegre could such coal compete, without government aid, with imported coals; but the high cost of transshipment of foreign coals from ocean steamers to lake boats has the same effect as a protective tariff in insuring a market for the product of the local mines.

The second coal-mining district is in Santa Catarina, inland from Tubarão not far from the southern border of the state. There are several mines in this district, all requiring a forty-mile rail haul to the nearest port, near Tubarão. The coal of Santa Catarina, however, is of somewhat better quality than that of Rio Grande do Sul. Although the ash content is still very high, certain of the coals from Tubarão can actually be made into coke; and it is coal from this source which is to be utilized in the proposed new Brazilian steel industry in the Paraíba Valley.

POPULATION CLUSTER OF SANTA CATARINA

The next population cluster north of Rio Grande do Sul is that of Santa Catarina, which contains only about a third as many people as its neighbor on the south. Both in its origin and its present condition it differs greatly from the district just described.

European Colonies

When Dom Pedro I decided to establish Colonies of Europeans in the South, his attention was focused chiefly on Rio Grande do Sul. Only one such attempt seems to have been made farther north. A group of Ger-

man mercenaries who had revolted from the Brazilian army in Rio de Janeiro, were placed in a colony not far from Lages, above the crest of the Serra Geral. This was not long after 1822. But almost at once this locality was found to be impossible for the colonists owing to the attacks of the Indians who lived in the forests of the Zone of the Escarpment. The new settlers abandoned their homes on the upland, and fled to the coastal settlements around Florianópolis. As the Indian menace was gradually eliminated, the forested country between the pastoral sertões of the highlands and the not very prosperous Luso-Brazilian towns clinging to the coast was left virtually unoccupied.

In 1848 a German surgeon named Dr. Herman Blumenau recognized the possibilities of settlement in this district. He saw in the valleys of the Zone of the Escarpment similarities to the Rhine, and pictured a day when these valleys might form important highways to the interior. His immediate concern was the settlement of a number of Germans from Pomerania who came "seeking liberty, happiness, and eternal tranquillity, through close attachment to this new land." The seventeen original colonists who arrived in 1850 were supplemented by more than six thousand before 1870. They cleared the land and established their farms and towns in the valleys inland from the port of Itajaí, especially around Blumenau and Brusque. Among these people were representatives of many different parts of Germany, although the Pomeranian group was the largest. Today the Pomeranian style of house, made of brick with outside beams, is a characteristic feature of the landscape, as is also the presence of good all-weather roads.

This new pioneer zone did not remain purely German. A number of Austrians and Swiss joined the group, and also a large contingent of Italians. In 1882 the German-speaking people made up 71 per cent of the total, the Italians 18 per cent, and the Portuguese only about 10 per cent.

A rapid increase of population took place also in this region, and expansion from it has been notable. Unfortunately, however, the nature of the terrain does not permit such compact settlement as was possible in the belt of forest along the cuesta front in Rio Grande do Sul. New pioneer colonies in Santa Catarina, at least in the first years of expansion, spread to new areas over the intervening ridges and mountains. Joinville, in back of the port of São Francisco, budded off from Blumenau. Then as the route from Joinville inland was found to be in reality the easiest one along this whole stretch of coast, the German frontiersmen advanced up and over the crest of the Serra Geral and began to expand

over the highlands. Rio Negro was settled in 1887. Today, Germans from Santa Catarina, who can trace their origin back to the settlements at Blumenau, are found all over the interior of Paraná, and, as merchants and business men, in the city of Curitiba.

The loss of population pressure by scattered expansion, however, did not produce a depopulation of the original nucleus. With the final elimination of the Indians, new clearings have pushed far inland up to the very headwaters of the Rio Itajaí and the other short streams of the Zone of the Escarpment. At present the pioneers of this district are cutting the last remnants of the forest in the valley heads near the crest of the Escarpment.

Present Region of Settlement

The last available census, taken in 1927, counted 98,663 people in the nuclear area of European settlement around Blumenau. The population density in a few places along the valley bottom is as high as 60 per square mile. Around certain centers the proportion of people of European origin is very high. Of the people of the town of Blumenau, for example, 63 per cent claim German as their mother tongue, and 33 per cent claim Portuguese. In the rural district around Blumenau the proportions are 75 per cent and 22 per cent. But there are also included in the same zone of dense population certain places which are predominantly Italian. Around one of these Italian towns, only 5 per cent are Portuguese, 7 per cent German, and 88 per cent Italian. In the region as a whole the proportion of nationalities as determined by the mother tongue is 40 per cent Portuguese, 40 per cent German, and 20 per cent Italian (190). Almost all of these people speak Portuguese, but use the mother tongue in the homes. Until recently the German colonists established and maintained many of their own schools, where the instruction was in German. Since 1938, however, it has been illegal to give instruction in any language except Portuguese. German cannot be taught until the fifth grade, and then only as a foreign language. Dr. Reinhard Maack estimates the people of German origin in Santa Catarina, whether or not they still speak German, at about 275,000 out of the total population of a million (193).

The agriculture which the German and Italian colonists now practice is, like that of Rio Grande do Sul, characterized by good farm techniques and a stabilized use of the land. The farming of this region is essentially a maize-hog combination, with hogs as the marketable product. The

German farmers grow maize and manioc, and feed hogs and milk-cattle. Today, butter from Blumenau, exported through Itajaí, finds a ready market in Rio de Janeiro. To this combination the Italians add rice, tobacco, and vineyards.

Many industrial establishments are to be found in the small towns of the region, especially along the coast in Florianópolis, Itajaí, Joinville, and São Francisco. Many different products are manufactured, ranging from paper to beer—of excellent quality. The factories are mostly small, but their products enter to a certain extent into the domestic commerce of the Brazilian coast, contributing, like those of Rio Grande do Sul, to the increasing commercial importance of the central city, Rio de Janeiro.

Although the majority of the European immigrants in Santa Catarina have not intermarried with the Luso-Brazilians, there are some mixtures to be found on the border zone between the older colonies of the coast and the later European settlements of the Zone of the Escarpment. The Germans, especially, are proud of their German heritage, of their techniques of agriculture, and of their low percentage of illiteracy. Although most of them would insist that Brazil was their homeland, they would also insist on the importance of the German contributions to the Brazilian nationality. Isolated as they are from the best aspects of Brazilian civilization, the persistence of the German tradition in this region is not at all surprising. There can be no doubt of the justice of the German pride in the accomplishments of this group of pioneers. It must be recognized, however, that this society of stabilized peasant proprietors was not exposed to the lure to quick wealth offered by the planting of coffee—a lure which proved irresistible to the German settlers in Espírito Santo.

POPULATION CLUSTER AND COLONIES OF PARANÁ

The settlement of Paraná is different, again, in its origin and its composition from that of the other southern states. Paraná includes fewer Germans, for one thing; and most of the Germans who are widely scattered over the state came originally from the expanding colonies of Santa Catarina. Among the European pioneers the first to be established in Paraná were the Italians. Today, however, most of the people there are of Slavic origin—Poles, Russians, Ruthenians, and Ukranians. The characteristic covered wagons of these people represent a peculiar importation from Europe into this part of the Latin-American landscape.

European Colonies

Colonization by European immigrants has taken place much more recently in Paraná than farther south. Between 1876 and 1879 the state government conceived and carried through a plan to colonize the rural territory around Curitiba with small farmers whose products would help supply the needs of the city. The land available for settlement of this kind was limited on the east by the increasing rainfall near the crest of the Great Escarpment, and on the west by the bold front of the Devonian cuesta. The elevation of about 3,000 feet restricted the crops to those which could be produced in areas subject to annual frosts. All the land had long before been included in the large estates of the Brazilians; but since these estates had never brought their owners much wealth there was no objection when the state government offered to purchase them from the fazendeiros. After securing title to the land, the government proceeded to mark off small lots, and, displaying most unusual foresight, to build good roads radiating from Curitiba throughout the new pioneer area. Italians and Poles, brought to Brazil with the aid of the state government, were settled on the land; and since the area was readily accessible to a large and growing urban market where these colonists could sell their eggs, milk, vegetables, and meat the whole scheme was successful and profitable. By 1885 there was no room for new colonists in this area; the Germans who began to come into Paraná from Joinville in Santa Catarina about this time, after establishing a group of farms around Rio Negro, had either to proceed into the inner lowland to the west or to remain in Curitiba, as merchants.

The establishment of pioneer colonies, however, did not stop after the completion of the Curitiba scheme. Since 1890 many new colonies have been planned and settled, some by private land companies, and others under government auspices—for the state government has maintained its intelligent interest in pioneering. Some of these colonies have prospered; others have failed. In almost every case the determining factor has been the degree of accessibility to a market.

One of the earlier colonial ventures was a marked failure because of isolation. Between 1889 and 1896 about 51,000 Poles entered Paraná, and were sent to a new pioneer zone then being established on the northern slopes of the Iguassú Valley, west of União da Vitória (Map 98). The rich terra roxa of this region gave the new settlers amazingly good crops, but only those colonists who had been established within ten miles of the railroad could get their products to a market easily enough

to make a profit. Those who went, hopefully, to more distant regions were literally lost in the sertão. After a few years of trial they found that the only product they could get to a market was hogs driven over trails impassable for wheeled vehicles. Soon these remote settlers followed the example of the mixed breeds of the western forests (known in this part of Brazil as *caboclos*); they became migratory farmers, making clearings in the forests, planting maize, permitting the hogs to do their own harvesting, and then abandoning the openings for new land. A considerable area of the forests of western Paraná has thus been destroyed by a very small number of people.

Other colonial settlements, however, were more fortunate. The Polish colonies, within reach of transportation facilities, became stabilized. Around Ponta Grossa a settlement of Russians, Poles, and Germans was established about 1898, and proved to be as successful as the earlier colonies around Curitiba; Ponta Grossa, a supply town on the old colonial cattle road, has had a new lease of life in recent years, since it has become an important rail junction (Map 101) and a focus of the new state automobile roads now being built into the western sertão. A little north of Ponta Grossa, along the railroad line, a Dutch colony has been successful; and during the last decade a new German colony was established, partly on the open grasslands, partly in the forest, but within easy reach of the town of Castro (Map 91).

The newest frontier in Paraná lies to the west of the diabase cuesta, on the good terra roxa of western Paraná. We have already described the remarkable Paraná colonies of the northwestern part of the state—colonies which belong geographically to the São Paulo region. Farther south there are other new pioneer areas, occupied by Poles and Germans, such as Mundo Novo, Terezina (Map 91), and Guarapuava (Map 98). New automobile highways are being built to these places, and even before they are surfaced with gravel, motor trucks are at work bringing the products of the frontier farms back to the thriving cities. The lesson has been well learned in Paraná, that pioneering involves both colonists placed on the land and urban markets in which they can sell their produce.

Forests of Western Paraná and Santa Catarina

The forests of western Paraná and Santa Catarina offer today Brazil's chief area for new colonization. This is the part of Brazil where there is the largest area of good land, free from tropical insects, and not so remote as to make the costs of road building excessive. Perhaps this is

the largest area with these qualities left in the world, where European colonization can still be carried on and where land can still be made available to settlers at low cost (155).

The forests of western Paraná are themselves of considerable value. They are an important source not only of lumber for building construction, giving rise to such thriving lumber centers as Piraí, north of Castro (Map 91), but also of charcoal, which is Brazil's most widely used fuel. The problem of charcoal and firewood is becoming more pressing as the more accessible forests are cut for these purposes, but in 1936, when the danger of increasing scarcity was being widely discussed, fully half of the freight carried by the railroads of Paraná still consisted of these forest products.

Maté

The forests of western Paraná also include important stands of *Ilex paraguayensis*, the tree whose leaves are used for maté. Between March and September each year a small army of maté collectors go into the forests—collectors recruited now from many of the pioneer colonies, especially from among Italians and Poles. The leaves are stripped from the trees and dried over small fires before being shipped by mule to the nearest railroad. Curitiba has become Brazil's chief maté center, where the leaves are further dried and pulverized before being packed for shipment.

Maté is widely used throughout southern Brazil, Uruguay, and Argentina, but outside of this part of South America, it is little known. Because no very large market has ever been built up, it has never brought such speculative prosperity to Curitiba as other wild products have brought to other Brazilian cities. Brazil produces about half of the total world supply of maté, and Argentina accounts for about half of the world consumption. Yet, in the Brazilian manner, planting the trees has been left to other people: the Argentine maté plantations of Misiones (Map 101) are increasing their productivity and may soon greatly reduce the market for Brazil's wild crop. Nevertheless, even if western Paraná has not experienced such a boom as shook the rubber forests of the Amazon, maté has provided welcome supplementary income to the people of the southern states.

Present-day Paraná

The population of Paraná, supported, thus, by varied economic activities, is estimated today at about 1,000,000. Of these, about 180,000

are Slavs, about 126,000 are Germans, and about 35,000 are Italians (193). The city of Curitiba is the focus of much of the colonial activity, and reflects the prosperity and relative stability of its hinterland by a steady if not spectacular growth. In 1938 its population was about 125,800. Although Paraná possesses, along with Santa Catarina, some of Brazil's best colonial land, and although the government of Paraná has been a leader in the enlightened administration of pioneer areas, there is still much room for improvement. Especially needed are careful surveys of the land in advance of settlement, and widespread education in the methods of soil conservation. For, good as the soils of western Paraná undoubtedly are, it must not be forgotten that, in terms of physical characteristics, they are most like those of the southern Appalachian Highlands in the United States—a region where unguided settlement has led to widespread soil destruction and to the development of a large area of rural poverty.

What do we learn from all this about the problem of Brazil's population? What differences can be observed between the parts of Brazil north of the border of São Paulo and the parts south of it? And of what importance are the differences?

Many writers point to the more invigorating climate of the South. Whether or not the somewhat lower winter temperatures result in producing an important increase of energy among the inhabitants of this country might be open to question for two reasons. In the first place no studies of the effect of temperature on energy have been made in this part of Brazil; and in the second place, even if the climate of the South were found to be less enervating than the coastal climates farther north, there are other factors which may be of much greater importance. The population of the South, especially of Rio Grande do Sul, was carefully selected, first, in the days of the early Portuguese settlers, for military capacity, and later, when the Germans were brought in, for capacity to do the hard work of woodland pioneering. We must not disregard the fact that in no other part of Brazil do the people enjoy such a satisfactory diet—the result of a greater variety of food crops, of cheaper meat, and of a different dietary tradition. That climatic conditions do, both directly and indirectly through the reduction of insect pests, have an effect on human energy need not be doubted; it is open to question, however, whether this effect may not be offset by human ingenuity, or whether other factors, such as diet, may not prove more important in producing health and energy.

In addition there are certain other differences between the South and the rest of Brazil. An outstanding peculiarity of the country south of the Paulista border is the absence of any source of speculative wealth. To be sure, certain parts of the South can and do grow sugar cane; but in the sugar period of the sixteenth and seventeenth centuries, the people of São Paulo who were settling the southern sertão were not wealthy enough to pay the heavy cost of setting up engenhos and buying slaves, and in those days sugar cane was excluded from the South for reasons of tradition and economic background. Later, although gold was discovered, and even led to the foundation of some of the chief towns, no such wealth of precious metals and gems was ever gained from any part of the South as led to the boom settlements of Minas Gerais. Because of frosts, coffee can only penetrate the northern fringe of Paraná, and so, during the last half century, the South could not share in this great speculative product. Finally, the collection of maté failed to bring in such wealth as rubber brought to the Amazon.

As a result of all these things, the system of the large rural estate, with its feudal society and its many tenant workers, could never become well established in the South except on the grazing lands of the campos. The forests, although partitioned like most Brazilian lands among a few owners, were never effectively occupied by the Luso-Brazilians. When colonists arrived in Brazil who were familiar with the techniques of forest living, these lands were mostly empty and ready for settlement. The pioneers who established themselves in the South were able to create their own society of small farmers, unhampered by the presence of any other social organization. There can be no doubt of the great contribution made by the German pioneers, who, as in southern Chile, led the way into the forests; but one may doubt whether the settlers of Blumenau would have been able to preserve their "eternal tranquillity" any more effectively than did the German settlers in Espírito Santo if big speculative profits from the planting of coffee had been within their reach.

17

BRAZIL: THE NORTH

FROM THE POINT of view of a geography of man, the North of Brazil constitutes a problem area, not because people are present there in great numbers, but because it is "one of the world's great deserts." The North,[1] or that part of Brazil covered by great expanses of tropical rain forest, makes up more than 40 per cent of the national territory, but it is inhabited by less than 10 per cent of the population. Furthermore, this 10 per cent is mostly concentrated around São Luiz in Maranhão and Belém in Pará, both near the ocean; the great basin of the Amazon is one of the world's larger areas of very sparse population, with a density of less than .5 per square mile over the region as a whole (Map 1).

Much too simple is the answer commonly given to the problem of sparse population in the Amazon—that the climate is unsuited to settlement by Europeans. Contained in the thick forests of the area there is a wealth of resources, some already exploited, some awaiting use. Many well-informed persons, who have traveled in this region, have been impressed with its possibilities. Why, indeed, should this part of Brazil be occupied by so few people, when the value of the exports, measured on a per capita basis, places the Amazon among the world's richest regions?

In 1853 Alfred Russell Wallace wrote the following estimate of the possibilities of settlement:

[1] The North includes chiefly Maranhão, Pará, Amazonas, and the Territory of Acre.

There is no country in the world where people can produce for themselves so many of the necessaries and luxuries of life. Indian corn, rice, mandioca, sugar, coffee, cotton, beef, poultry, and pork, with oranges, bananas, and abundance of other fruits and vegetables, thrive with care. With these articles in abundance, a house of wood, calabashes, cups, and pottery of the country, they may live in plenty without a single exotic production. And then what advantages there are in a country where there is no stoppage of agricultural operations during the winter, but where crops may be had, and poultry be reared, all the year round; where the least possible clothing is the most comfortable and where a hundred little necessaries of a cold region are altogether superfluous. With regard to the climate I have said enough already; and I repeat, that a man can work as well here as in the hot summer months in England, and that if he will only work three hours in the morning and three in the evening, he will produce more of the necessaries and comforts of life than by twelve hours daily labor at home.[2]

These assertions have yet to be tested. For whatever reason, the history of man in the North of Brazil can almost be described as a caricature of the Brazilian economy. In this region the temporary, exploitive character of Brazilian economic life is carried to an extreme; here we find again and again illustrations of the disaster which follows the attempt to collect the fruit without planting the tree; here is a land abundantly endowed with resources only waiting to be collected. The planting of the tree, however, requires so much labor and so much capital that the establishment of the more permanent and intensive forms of land use seems to be impossible. Once more we find difficulty in determining whether destructive exploitation is a cause or a result of sparse population. In recent years, however, the whole traditional system of exploitation meets a challenge in the Ford plantations: at last Wallace's enthusiastic evaluation of the possibilities of life in the Amazon Region is being put to the test. Setting aside, as far as possible, all preconceptions and prejudices regarding life in the rainy tropics, let us examine the facts objectively.

THE LAND

Popular misinformation seems to be more widespread regarding the North of Brazil than it is regarding any other region of South America. This is the result in part of the deep-seated preconceptions concerning the effect of tropical rainy climates on people of European origin, in part of the exaggerated stories of the rubber days, and in part, no doubt, of the well-known Hollywood version of life in the tropical forests. The Amazon Region is, actually, the world's largest area of tropical rain for-

[2] *Travels on the Amazon and the Rio Negro*, London, 1853, pp. 55–56.

est; it does lie almost exactly along the equator; it is true, as Roy Nash puts it, that the problem here is "whether man can be happy in the rain"; yet we may not assume that the mechanical ingenuity of European people cannot lead to a solution of tropical living as it has led to the solution of living in the severe winter climates of the higher middle latitudes, long relegated to barbarians by the writers of the past.

Surface Features

Only a small proportion of the Amazon Region can be described as a plain. Above the junction with the Rio Negro and the Rio Madeira (Map 103), the plain widens out like a spatula, until a distance of some eight hundred miles separates the highlands to the north and to the south (Map 6). This is the part of the basin lying just east of the Andes, drained by the Purús, the Juruá, the Javary, and the main stream.[3] Most of the surface of this large area is underlain by unconsolidated gravels, sands, clays, and silt. About 90 per cent of this surface is above the level of the highest floods. The floodplain of the main stream is mostly less than fifty miles wide.

East of the junction of the Amazon with the Rio Negro and with the Rio Madeira the bordering highlands come closer and closer together, until only the immediate floodplain of the river is left as a band of lowland between them. East of the junction of the Xingú, however, the plain again widens out, leaving a broad area of low country on either side of the mouth. This lowland extends along the coast northward into the European colonies of Guiana, and southeastward to Maranhão. Because of the gradual submergence of the land where the Amazon empties into the sea its mouth is embayed; there is no delta, although the yellow, silt-laden waters discolor the ocean for as much as two hundred miles offshore.

The floodplain of the Amazon is similar in its pattern and its dimensions to the lowlands bordering other great rivers, such as the lower Mississippi. The area covered by water in time of flood is only twenty miles wide at Obidos and Santarém, but for most of the course below the Rio Negro it is fifty or sixty miles wide. The floodplain is bordered by sharp valley bluffs which stand at least 150 to 200 feet above the swamps

[3] The main course of the Amazon is given different names in different sections: The Peruvians call it the Río Marañón; from the Brazilian border eastward as far as the junction of the Rio Negro, the Brazilians call the main stream the Solimões; and from the Rio Negro to the sea they call it the Amazonas. We use the English name, Amazon, to refer to the whole course of the main stream as far as the Pongo de Manseriche in Peru where the Río Marañón emerges from the Andes.

THE AMAZON REGION
HEADS OF NAVIGATION
FORD PLANTATIONS
0 SCALE 300
MILES
COLOMBIA
VENEZUELA
BRITISH GUIANA
DUTCH GUIANA
FRENCH GUIANA
BOLIVIA
RIO ORINOCO
RIO CASIQUIARE
RIO NEGRO
RIO BRANCO
AMAZONAS
RIO
RIO JURUÁ
RIO PURÚS
RIO MADEIRA
RIO TAPAJOZ
RIO XINGU
RIO ARAGUAIA
RIO TOCANTINS
MARAJÓ I.
BRAGANÇA
BELÉM
SÃO LUIZ
OBIDOS
SANTARÉM
BELTERRA
FORDLÂNDIA
MANAUS
PORTO VELHO
RIO BRANCO
RIBERALTA
0°
5°
10°
45°
50°
55°
60°
65°

MAP 103

along the river. The river meanders across this lowland between the valley bluffs, swinging at intervals against the margins of the floodplain; frequently its channel is shifted, leaving oxbow lakes and swamps; along its banks, and also along the sides of the abandoned channels, there are natural levees which stand a little higher than the rest of the floodplain; and all these features between the bluffs are arranged in the characteristic crescentic patterns of all river-built plains.

The Guiana and Brazilian highlands, which all but join near the mouth of the Amazon, are built of the same fundamental elements. There are the crystalline hilly uplands, surmounted by a few massive mountain ranges, or by conical-shaped mountain remnants, and surmounted also by the sandstone-capped tabular uplands or plateaus. The Amazon itself follows the axis of a huge structural basin, a portion of the earth's crust which is in the process of sinking very slowly. Immediately bordering the river in its lower course are the tabular remnants of relatively young sedimentary rocks which cover the deeply buried crystallines, as along the coast of the Northeast. On the northern edge of the floodplain northeast of Santarém, the edge of these younger strata forms a taboleiro the top of which stands as much as 1,150 feet above sea level, forming a major landmark along the river.

The main stream has a remarkably low gradient all the way from the front of the Andes to the sea. Although careful measurements of altitude have yet to be made, it is approximately correct to give its elevation at Manaus as only about a hundred feet above the sea. The Amazon is deep enough to permit ocean boats of less than fourteen-foot draught to sail all the way to Iquitos in eastern Peru.

The Amazon tributaries, however, are all interrupted by falls and rapids where they cross areas of crystalline rock. The falls of the Madeira, above Porto Velho, which may be reached by shallow-draught ocean vessels, are situated where the river cuts through the westernmost projection of the Brazilian Highland. The tributaries west of the Madeira are all navigable for river boats far upstream into Acre Territory (Map 78). East of the Madeira, on the other hand, the Amazon tributaries are all interrupted by rapids within 200 miles of the main stream. The Tapajóz is navigable for 175 miles, the Xingú for 120 miles, and the Tocantins for about the same distance. In the highlands these streams are so frequently interrupted by falls and rapids that they are quite useless for navigation except by canoe. On the northern side, the Rio Negro is navigable for river boats even through the narrows above Manaus (Map 104); and the Rio Branco is navigable for small boats far upstream.

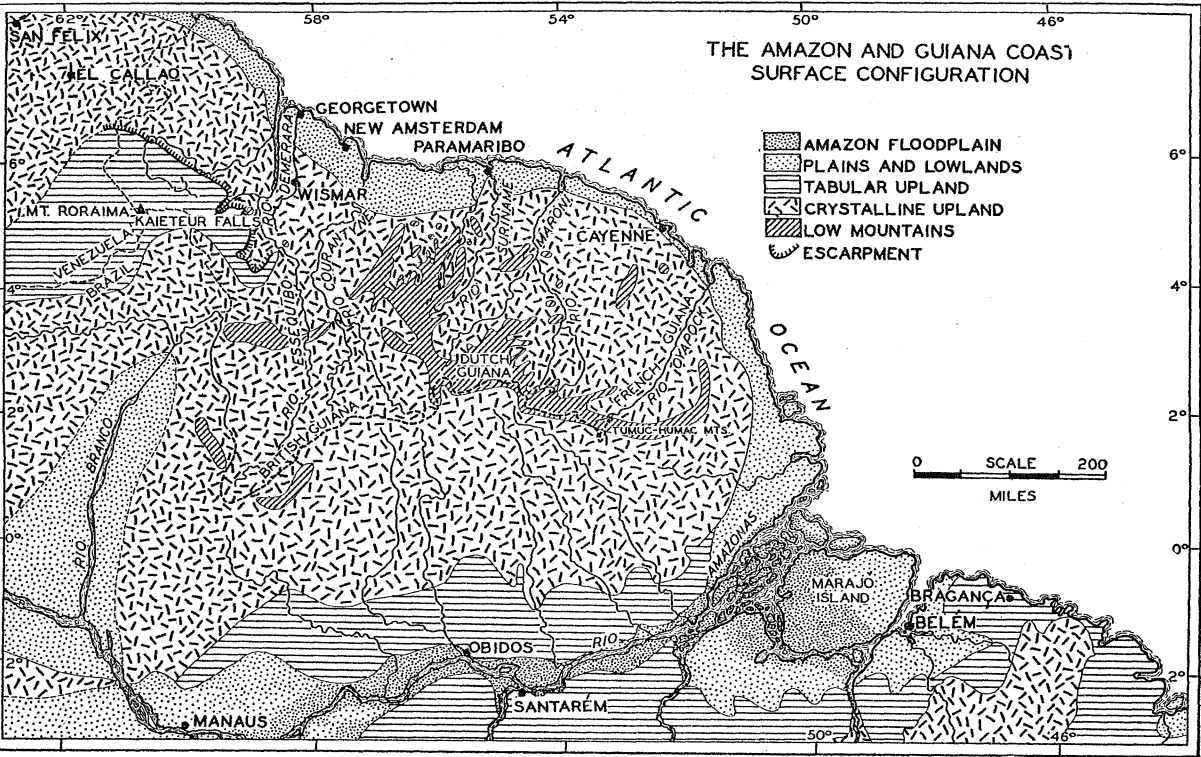
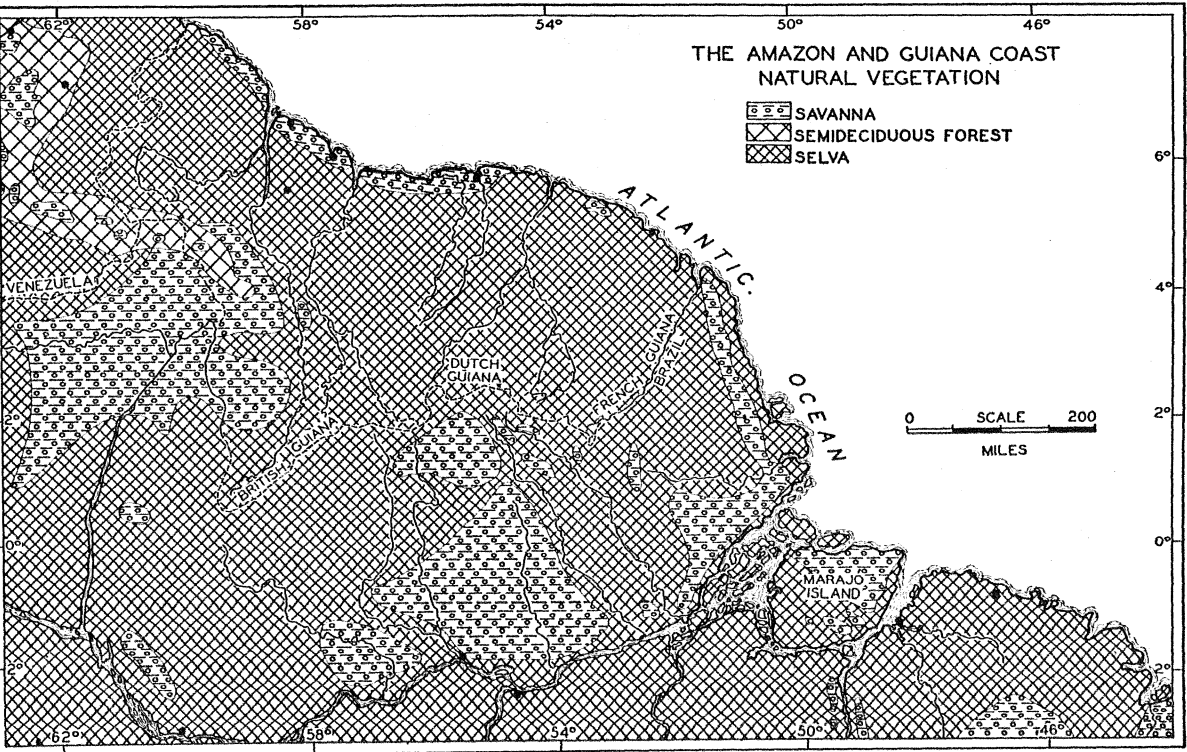
In Maranhão, on the border between the North and the Northeast, there is another zone of submergence along the coast. The lower sections of the three rivers which converge on the bay of São Luiz (Map 80) are drowned, and the inner margin of the bay is bordered by a swampy lowland, twenty-five to fifty miles wide, across which the rivers sprawl in meandering courses. Wide floodplains extend far inland along these rivers. Only on the interfluves are there flat-topped mesas which tell of the formerly widespread cover of sandstone strata now greatly dissected by stream action. During the flood season the valleys and the lowlands around the bay are inundated, leaving only the natural levees standing above the ordinary high-water level. The rivers are navigable for small craft for hundreds of miles into the interior.

Soils

The myth of the fertility of tropical soils has long been subject to attack, yet it remains strangely persistent. The forests of the rainy tropics are luxuriant because of the warm, moist climate. On tropical plains where the soil is exposed throughout the year to the percolation of water under conditions of high temperature the soluble minerals are leached out, leaving only the relatively insoluble iron and aluminum compounds at the surface. Also, the finer soil particles are carried down, leaving the surface horizon coarser than it was originally. Add to these things the fact that organic matter falling on the ground is quickly destroyed so that relatively little of it gets mixed with the mineral soil to form humus, and the essential poverty of the soils may be appreciated. Only on the river floodplains, where new layers of silt are deposited with each flood, are the soils fertile.

Fertility, however, is not a quality inherent in soil alone: it can only be measured in terms of specific soil uses. The tropical lowland soils, outside of the floodplains, are infertile for shallow-rooted crops; ordinary food crops growing in soils which are so deficient in mineral properties do not provide the mineral salts necessary for good diet. Tree crops adapted to the climatic conditions, on the other hand, are more dependent on favorable ground-water conditions than they are on the quality of the surface soil.

Climate

One of the commonest items of misinformation concerning the Amazon Region is the belief that its temperatures are unbearably high. As a

Map 104

Map 105

matter of fact, they are not so high as those of a summer heat wave in central North America. The highest temperatures in South America occur along the Caribbean Coast and in the Gran Chaco of Argentina. Temperatures in the Amazon Region are high, but not excessive; the most disagreeable effect of the temperature is its monotony—disagreeable, that is, to people accustomed to the nervous strain of the rapid and extreme temperature changes characteristic of mid-latitude cyclonic climates. At Santarém, for example, during the period from 1914 to 1919 the highest temperature recorded was 96.3° and the lowest was 65.3°. The average for the year is 78.1°, and the range between the average of the warmest and coldest months is only about 4°.

The humidity, on the other hand, may be high enough to be very uncomfortable, especially in places protected from the wind. In the rainy tropics the steady movement of the easterly trade wind over the oceans brings great quantities of moisture onto the land, but it also makes living quite comfortable in spite of the humidity. As one proceeds inland the relative humidity decreases—at Manaus it averages 78 per cent—but the wind also decreases in strength and becomes variable. Day and night throughout the year, the winds blow strongly on the eastern coasts; but inland there are times when the wind dies down. The difference between daytime temperature and night temperature may be as much as 15°; such a drop of temperature results, in some protected places, in the formation of low banks of fog.

The rainfall of the whole Amazon area is abundant. Only in the upper part of the basin, and along the coast, are the averages more than 80 inches a year (Map 9); but no part of the area can be considered dry. The rains come during the period from January to June when the warm, moisture-laden equatorial air masses from the North Atlantic sweep far southwestward into the interior of South America (Map 79a). The drier part of the year, from July to December, is in reality only a season of less rain. In both rainy and dry seasons precipitation comes in the form of violent showers, followed by sudden clearing. Great rolls of cumulus cloud, the swish of rain on the leaves of the forest, and the smell of the warm earth suddenly moistened are common experiences in this region. The nights are almost always brilliantly clear.

The Forest

With the forest, more than with any other feature of this region, must man contend. In the forest are the riches of the region; on the control of the forest the settlers must expend the greater part of their energies,

around Salvador and Recife, and to these places came the cargoes of Negro slaves from Africa, for the great prosperity of the sugar business in the Northeast was based on the labor of the Negroes.

Meanwhile sugar cane was also planted around the two primary settlement centers of the North—São Luiz and Belém. São Luiz, founded during the sixteenth century on its protected island, became an important sugar port, with numerous plantations strung along the natural levees of the bordering lowland. During the seventeenth century the state of Maranhão shared with the Northeast a considerable amount of prosperity, and São Luiz was surpassed in importance only by Salvador and Recife. But there was one great difference between the sugar industry of Maranhão and that of the Northeast. In the North the labor was furnished chiefly by Indian slaves: the costs of production proved to be so much higher where the relatively inefficient Indians were used that by the end of the seventeenth century the sugar plantations of Maranhão had been definitely excluded from the market.

Penetration of the Amazon

One of the chief sources of Indian slaves during the colonial period was the Amazon Region. In 1616 a Jesuit mission was founded at Belém, and from this place missionaries moved inland along the rivers, establishing mission stations on the valley bluffs where the river, swinging against the margin of its floodplain, made these bluffs accessible. Although most of the interior was originally assigned to Spain by the Treaty of Tordesillas, the Spaniards were too much involved with the occupation of the West Coast and the Andes to pay much attention to this vast domain so difficult to reach from their side of the continent. Meanwhile Portuguese slave raiders followed quickly in the footsteps of the missionaries; for a time Manaus was important as a concentration point for slaves captured at many scattered places farther upstream.

The arrival of the Europeans brought disaster to the native peoples. Epidemics decimated the crowded populations of the mission stations and slave raiders carried into captivity those who survived the ravages of disease. Today scarcely ten thousand Indians inhabit the great empty forests. Small tribes are found chiefly in remote places, for the surviving natives have learned to fear and avoid white men. The Indians still practice a shifting cultivation of manioc and maize, supplementing their starchy diet with fish and eggs, rarely with a little meat, but sometimes with the fruits and nuts they find in the forest. They make little permanent impression on the forest, for their abandoned clearings are soon

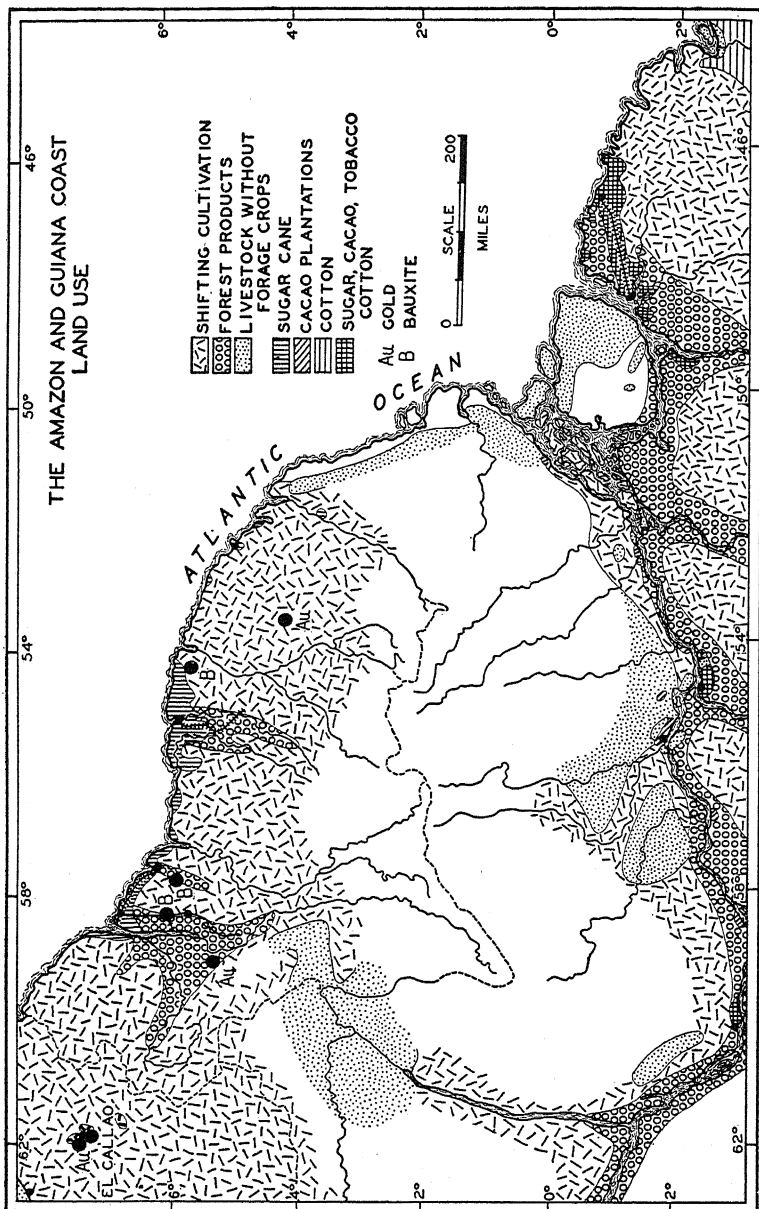
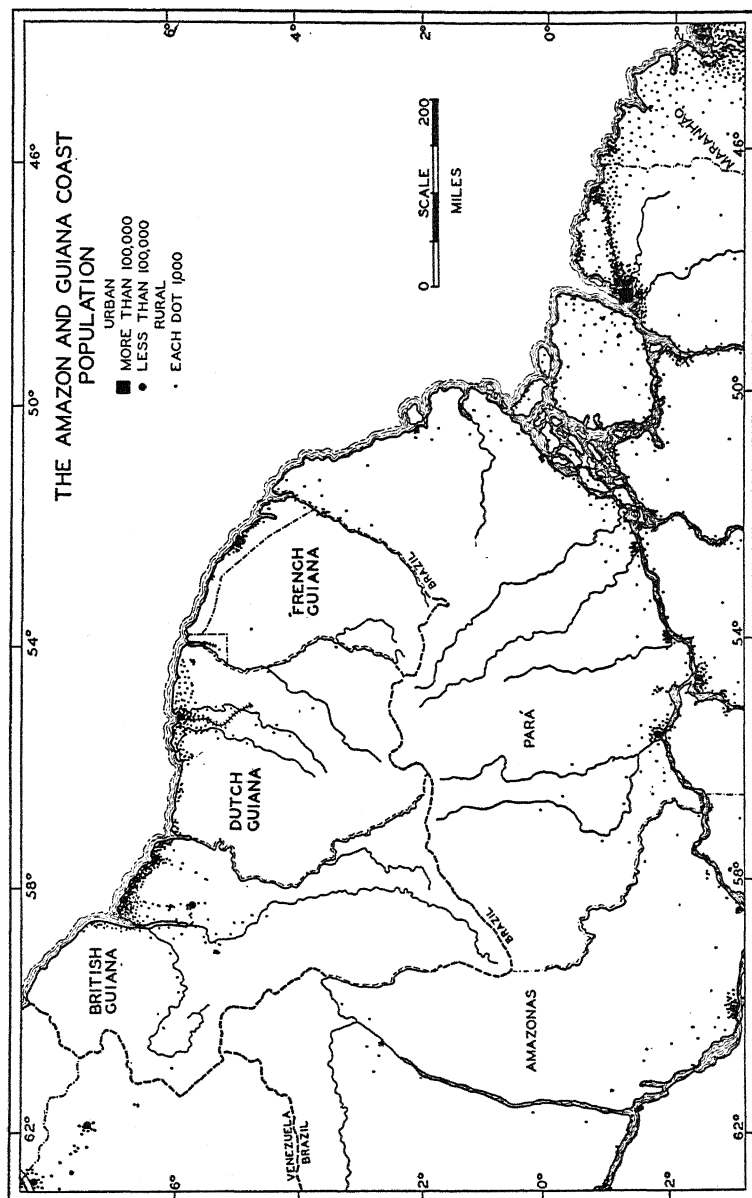
obliterated by new growth—visible only from the air by the variations in the coloring of the unbroken sea of foliage.

Agricultural and pastoral activities in the North were concentrated in only a few spots. The territory in the vicinity of São Luiz and of Belém, after the decline of the early sugar plantations, was utilized for the grazing of cattle, which is even today the chief economic activity of both these districts—cattle pastured on the wet savannas of the swampy areas, cattle forced sometimes to swim for their lives during the floods, cattle hardy enough to survive the insect pests of these lowland areas. Both Belém and São Luiz prospered for a time during the eighteenth century on the production of coffee, cotton, and rice, until other parts of Brazil produced these things more cheaply. Settlements appeared around Santarém, Obidos, and Manaus. Around each of these places there were small areas devoted to cacao, sugar cane, and other tropical specialties, but remarkably little area was devoted to subsistence food crops. Back of Obidos, and in places along the floodplain, the savannas were used for cattle. Far up the Rio Branco, north of Manaus, cattle were, and still are, pastured on the dry savannas (Map 106).

Nevertheless, further attempts to establish agricultural colonies in the region were actually made. Shortly after the end of the North American Civil War a group of people from the Southern States of the United States, desiring to continue under a regime of slavery, established a settlement not far from Santarém, bringing their slaves and tools with them. In the 1870's this group was visited by a North American traveler and found to be filled with pioneer zeal, enthusiastically engaged in clearing the forest and planting cotton and sugar cane. But the place selected for the colony was too remote. Although steamboats sailed the Amazon after 1866, making Santarém a regular port of call, the cost of transporting the small volume of cotton or sugar to distant markets, and of importing essential articles, was so great that the American colony near Santarém was almost entirely cut off from the outside world. No Occidental pioneer colony which remains in isolation has been successful in the modern period, whether in the Amazon or elsewhere. Today only a few impoverished families remain, and these have thoroughly lost the optimism which is the chief source of strength for the successful pioneer.

THE RUBBER PERIOD

When the world was ready for rubber, the Amazon Region began the spectacular period of forest exploitation which resulted in scattered

THE AMAZON AND GUIANA COAST
POPULATION
URBAN
MORE THAN 100,000
LESS THAN 100,000
RURAL
EACH DOT 1,000
0 SCALE 200
MILES
BRITISH GUIANA
DUTCH GUIANA
FRENCH GUIANA
BRAZIL
VENEZUELA
BRAZIL
PARÁ
AMAZONAS
MARANHÃO
62°
58°
54°
50°
46°
6°
4°
2°
0°
2°

Map 107

settlement in widely separated places. In the tropical rain forest south of the main stream, and in the headwater areas of eastern Bolivia, Peru, Ecuador, and Colombia, there are two chief species of tree from which rubber can be produced. The better of these species is *Hevea brasiliensis*, from which latex, a milklike substance, can be extracted from cuts in the bark. The other is the *Castilla ulei*, from which rubber can be extracted only by cutting down the tree. Like all the other species in the tropical rain forest, both Hevea and Castilla trees are widely scattered, seldom with many individuals standing close together. No source of rubber comparable to the Hevea tree has been found in any other part of the world, although most of the world's rubber now comes from a variety of Hevea which is much more productive than the native wild trees of the Amazon.

Exploitation of Rubber

Rubber was not a product of major importance until two things happened. The first was the discovery of the vulcanizing process in 1839 by Charles Goodyear—a process which makes it possible to keep rubber from becoming sticky in hot weather or brittle in cold weather. The second was the manufacture of various mechanical and electrical devices in which rubber is an essential element, such as automobile tires and electric insulation. In 1827 Belém exported 69,174 pounds of rubber; in 1853 the exports jumped suddenly to 5,214,560 pounds.

Here was a situation characteristically Brazilian. A new world market of unlimited possibilities suddenly makes its appearance; Brazil finds itself in possession of a monopoly of the raw material needed to supply this market; the chief factor limiting the increase of production is the scarcity of labor. The immediate result—a frantic rush to the rubber forests and a mad scramble to share in this new source of speculative wealth. Land was purchased in Belém or Manaus without any preliminary survey, much as one would draw a hand in a poker game. Later, the purchaser would find out whether he was wealthy beyond his dreams or had completely lost the purchase price—all depending on the number of rubber trees that could be found in his forest. Who in that region and in that atmosphere of speculative profit could have thought of undertaking the hard work of clearing the forest, preparing the land, planting young rubber trees, and caring for them during their period of early growth?

The chief problem was finding laborers to do the work. The story

of the recruiting of the rubber gatherers is not a pretty one—especially in the eastern parts of Bolivia, Peru, Ecuador, and Colombia, where the arm of the law could scarcely reach across the Andes. The virtual slavery and the almost universal mistreatment of the Indians, many of them recruited from the highland communities of the Andes, makes a sad chapter of human brutality, now long since closed. In the Brazilian Amazon conditions were scarcely better. Most of the workers who came into the region during the 1870's and 1880's were from the drought-stricken regions of Ceará. People from Ceará poured into the Amazon during part of the rubber period in numbers averaging 20,000 a year; but few of them returned. Today a very large proportion of the Brazilians scattered over this vast extent of territory came originally from the sertão of the Brazilian Northeast.

The rubber was gathered by workers who were almost literally buried in the forest. The owner of a tract of land recruited his workers in Belém or Manaus, loaned them the funds with which to buy not only essential items of equipment but also tinned foods. Each family of workers was then transported to a spot on the river bank accessible to the launch of the owner, and there deposited and left to build a rude shelter for a home. From each isolated camp the gatherer cut for himself a path or *estrada* through the forest, leading perhaps to as many as two hundred rubber trees. The latex tapped from these trees was brought to the camp and there formed into solid rubber balls by smoking over a slow fire. There could be no supervision of the tapping methods and no care of the trees to insure their continued productivity. At intervals the owner's launch would make its appearance to pick up the product, and to leave supplies, for which the worker was never quite able to pay—and thus always remained in debt.

Pattern of Settlement

Since the only means of transportation were the river boats, and since the rubber was brought down the smaller rivers to the larger ones and finally to the main stream, the chief centers of settlement appeared at such strategic spots as the river junctions or the heads of river navigation. The owner could establish his base at the outlet of the rivers which gave access to his lands and from that spot control all that passed up or down. The chief concentration of both people and wealth was in the two major cities of Manaus and Belém. In these places money was squandered as it is in a gold-rush town. The Brazilians, lovers of music and the

artistic life, built in Manaus that great monument to the Brazilian system—the opera house, whose vast dome with its orange diamonds on a green background (the colors and design of the Brazilian flag) still dominates the city and is visible even over the forest as one approaches from downstream.

There were rich rubber forests beyond the limits of navigation along the southern tributaries of the Amazon. Towns were founded at the heads of navigation, and roads, passable only for oxcarts, were built through the forests to the stretches of water above the rapids which were navigable by canoe. Railroads were projected with unlimited optimism, but only one is still in operation. In 1878 the construction of a railroad around the great falls of the Madeira was started; but the terrible toll of malaria forced the abandonment of the project. When Brazil succeeded in getting the rich Acre Territory from Bolivia in 1903, part of the agreement included the construction by Brazil of a railroad to give the remainder of eastern Bolivia access to navigable water. The line was to start at Porto Velho to which ocean steamers could come and was to extend to Riberalta on the Río Beni, above the uppermost rapids (Map 103). In 1913 the line was completed from Porto Velho to the Bolivian border, but a bridge across the Madeira and a short extension beyond to Riberalta remained unbuilt. By 1913 the rubber period was over.

Collapse of the Rubber Business

Brazil's system of destructive exploitation of rubber collapsed because someone else planted the trees. In 1876 an Englishman named Henry Wickham collected some Hevea seeds in the Tapajoz Valley. These were sprouted in the Kew Gardens at London, and then transplanted in the Botanical Gardens in Colombo, Ceylon. "Wickham's Baby" they call the big rubber tree at Colombo from which came the seeds to start the first rubber plantations of Malaya and Sumatra in 1896. The plantation rubber comes from the same kind of tree as did the wild rubber of the Amazon; but for a number of reasons the costs are only a fraction of the costs of collecting the wild product. The yield of rubber per tree per year in the Amazon forest is only about three pounds; the Malayan varieties of Hevea yield from 10 to 17 pounds. One man in the Amazon could scarcely attend to more than two hundred trees; in a rubber plantation one worker takes care of more than five hundred trees. In the Amazon there could be no supervision of the tapping methods and no care of the trees; in a plantation the trees can be given the attention of

experts to guarantee maximum yields. In the Amazon the workers were exposed to all the dangers and hardships of life in the forest; on a plantation the workers are carefully housed, given medical attention, and a carefully regulated diet. Close to the rubber-growing region of Malaya and Sumatra are such densely populated lands as Java, Indo-China, Siam, and India, where large numbers of efficient workers could easily be recruited. No such source of labor is available, under existing world conditions, in the Amazon Region.

There could have been but one result. In 1905 the plantations of British Malaya and Dutch Sumatra produced only a small fraction of the world's supply of rubber. In 1910 they produced 9 per cent; in 1914 they produced 60 per cent; and by 1924 the plantations accounted for about 93 per cent. Early in 1909 the increasing demand for rubber for use in the manufacture of automobile tires caused a frenzied boom in the Amazon, even in the face of the growing competition of the plantations. Credits were extended; new laborers were hastily recruited and sent into the forests. But in April, 1910, the whole crazy financial structure of credits collapsed, ruining large numbers of the speculators. Rubber production continued to increase until 1912, and even longer in places where Castilla trees could be cut down. But since 1912 Brazil has had only a very minor share of the world's production of rubber.

Decadence

The collapse of the rubber business left many of the rubber workers stranded. Many of them drifted into Manaus, Obidos, Santarém, or Belém, to swell the population of those places. For most of the time, however, there was little economic activity by which these people could gain a living. Many parts of the cities were virtually abandoned in favor of temporary homes scattered in the outskirts. Yet, strange to relate, there was little increase in the amount of land devoted to the production of food crops. It was estimated during the '20's that in the whole Amazon Region there was scarcely a hundred square miles devoted to any kind of agriculture, let alone the production of local supplies of food. In the interior many of the smaller towns whose names still appear on standard maps are entirely abandoned, engulfed in the rapidly advancing jungle.

It is said in Brazil that if money is to be made from the most poverty-stricken of areas, the Syrian traders will make it. In the Amazon the Syrians have taken over most of the retail trading. By advancing loans

to the isolated groups of people outside of the larger urban centers, they have established their control over them. Just as the rubber owners used to do, the traders now control the passage of goods up and down the streams by placing their posts at strategic river junctions. So powerful are some of the larger traders that permission to travel in these remote spots depends on their word. From the pitifully small volume of an enormous variety of forest products contributed by individuals scattered over this vast area, the traders are able to take the very considerable profits. The forest products include gums, nuts, roots, cabinet woods, and the skins of rare animals.

The most valuable single items coming from the Amazon today are the edible nuts. The Brazil nut, collected from the forest giant known as *Bertholletia excelsa*, is brought to Belém for shipment. Workers are sent out into the forest, especially along the Rio Tocantins, at the time of the year when the nuts ripen. Again no cultivation is attempted—only the collection of a product which has fallen from the tree. Today Brazil produces the greater part of the world's supply of Brazil nuts; yet already even this supremacy is threatened by plantations of this tree now set out on an experimental basis in British Malaya.

São Luiz is the shipping point for the Babassu nut, a source of vegetable oil. The Babassu palm grows wild in the zone of transition between the rain forest and the savannas and scrub forests of the Northeast; there are large areas covered by this valuable tree throughout Maranhão and Piauí. Again, the product is collected by workers temporarily recruited for the job, and there are no plantations. Yet the Babassu nut brings to São Luiz at least a temporary increase of activity, and attracts to it a new stream of migrants.

Agricultural Settlement in Pará

Agricultural settlement was actually attempted in Pará. Along the railroad line which extends from Belém to Bragança there were, in addition to groups of small farmers raising food crops for the supply of Belém, Japanese colonists. A Japanese land company owns more than 2,500,000 acres in Pará, although the company has been able to settle no more than 2,000 Japanese at the most. Many of the original settlers have in recent years moved to São Paulo to swell the current of migration to the western frontier of that state, yet Pará remains the most important agricultural area in the whole Amazon Region—the most important, that is, outside of the Ford Plantations.

THE FORD PLANTATIONS

In 1927 an event of great importance took place in the North of Brazil. The *Companhia Ford Industrial do Brasil* purchased a tract of land, including some 2,500,000 acres, along the right bank of the Rio Tapajóz about 135 miles upstream from the Amazon. The area was known as Fordlandia. At the nucleus of the settlement a modern town was built. About 8,400 acres of rubber trees were planted before a number of unexpected difficulties began to appear. Diseases attacked the plantations of Hevea trees while the same kinds of trees, widely scattered through the rain forest, seemed to be immune. Also Fordlandia was found to be so hilly that soil erosion became critical and the use of machinery was difficult. In 1934 a part of the original concession was exchanged with the state of Pará for a new tract of land, including 600,000 acres, only 30 miles up the Tapajóz from Santarém. This new tract is called Belterra (Map 103). Up to April, 1939, about 12,500 acres had been planted with rubber in this area. The more nearly level land at the new site permits the more efficient use of machinery and better agricultural practices. Selection of disease-resistant stock and the grafting of high-yielding Malayan varieties on the hardy roots of indigenous trees are expected to overcome the technical problems of rubber growing in the Amazon.

The Ford project remains essentially an experiment. Rubber has not been produced commercially so far, although some of the plantations have been tapped since 1937. Even at full production, the Ford Plantations could scarcely account for more than a fraction of the world production. The importance of the project is not so much in the effect it may have on the world rubber supply as in the light it throws on the question of the habitability of the Amazon and the possibilities of stabilized economic development.

At present the population of Fordlandia and Belterra is approximately 12,000. The workers and their families are housed in modern dwellings, carefully screened and protected from insects. The whole colony receives free medical attention, and is supplied with food on the basis of carefully determined needs of tropical workers. There are schools, recreation facilities, and other services unknown not only in other parts of the Amazon, but even in the more prosperous parts of rural Brazil. Today the Ford Plantations rank among the most healthful places in Brazil. At last the estimate of the habitability of the Amazon as written nearly ninety years ago by Wallace is being put to the test.

The Lesson of the Ford Plantations

What light does the experiment of the Ford Plantations throw on the problem of the empty Amazon? Plainly the kind of living which has made its appearance in Fordlandia and Belterra could not be supported on the basis of the exploitation of resources in the Brazilian manner. Some persons insist that these new standards of living could not be supported by an ordinary plantation economy even if it were operating at full capacity. On the other hand, other persons claim that the increased productivity of workers who are protected from disease and who are adequately nourished would more than make up for the increased cost of a standard of living such as is being maintained at the Ford Plantations. Perhaps it is true that only an outside organization, amply supplied with funds, could support such an expensive project. Still we may ask whether stabilized settlement is rendered impossible by the nature of the land or by the economic, social, and political system under which the settlement process must go forward. It is not difficult to imagine a changed economic world, in which settlement in the Amazon would be possible. If such a change takes place, the preconception that the climate itself is responsible for the failure of settlement will be clearly tested by actual experience.

Meanwhile one other aspect of the problem must be understood. Even to bring the whole available area of the Ford Plantations into full production would require a much larger number of workers than are at present available. To clear any considerable area of the Amazon country and bring new rubber plantations into production which would seriously rival the plantations of Malaya and Sumatra would require an enormous number of immigrants. Under what conditions such a migration to the North of Brazil might take place is difficult to conceive. Under present conditions the Brazilians would not be likely to permit the entrance of any adequate number of Oriental people, nor of any other single foreign group; yet as long as São Paulo continues to produce one form or another of wealth, the remote Amazon is not likely to prove sufficiently attractive to reverse the present trend of the Brazilian population. The possibilities of development in the North, as in most other parts of Brazil, are fundamentally restricted by lack of people.

The great blank spot on the map of population is not likely soon to be filled. Not that the land, because of its inherent character, prohibits the settlement of white people in this region; not that the technical skill of the Occidental peoples is insufficient to solve the problem of tropical

living; but rather that the application of this technical knowledge is rendered impossible at present by the attitudes, traditions, and systems of living of Occidental people. So the Syrian trader, thoroughly adjusted to the situation as it exists, continues to grow rich; flurries of speculative fever from time to time stir the cities and send people scurrying over the grass-grown streets. Still, from the midst of the encircling woods, the great orange and green dome of the Manaus opera house stands as a supreme monument to the poetic aspirations of a people intoxicated by a moment of easy wealth.

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BRAZIL AS A POLITICAL UNIT

NEARLY HALF of the continent of South America belongs to the United States of Brazil. But most of this enormous territory, whatever may be its possibilities, remains empty. Although more than half of the people of South America are Brazilians, the land they occupy is so vast that in only a few isolated areas have they been able to build up a population density greater than ten persons per square mile. Most of Brazil, even after four centuries, remains a frontier land in the sense that a sparse population exerts a minimum of control over it. The spirit of the speculator and the methods of the miner have produced shifting and unstable patterns of people. Yet the urge to obey the slogan *fique rico*,[1] comes more naturally to the imaginative mind of the Brazilian than does the desire for permanence and stability to be won only by less spectacular forms of toil.

A speculative economy is not the peculiar possession of Brazil. In a sense this type of economy characterizes the whole Occidental world. The desire for loot and quick profits motivated the settlement not only of Portuguese and Spanish America, but also of Anglo-America. But in North America and in a few parts of Latin America, the increasing number of people in relation to land and resources diminished the opportunities for continued speculative profits. In Brazil speculative economy has survived four centuries of settlement in most parts of the national

[1] *Fique rico* means literally "get rich." It is the slogan of the Federal lotteries of Brazil.

territory. The continued effort to collect the fruit without planting the tree constitutes the Brazilian variation of the fundamental Latin-American theme announced in the opening pages of this book by the story of El Dorado.

The definition of the effective national territory is more difficult to make in Brazil than it is in most other countries of Latin America. Between the relatively small areas of the interior from which Brazilian citizens have never derived a profit and in which not even a subsistence economy has ever been established, and the regions of concentrated settlement on or near the Atlantic coast, there is a wide intermediate zone of transition—the lands known as the sertões. In this intermediate zone a very few people, widely scattered, contrive to make a permanent living from a large amount of land. Only intermittently, perhaps, is any one section put to use; only to a very minor degree do these regions contribute to the Brazilian economy as a whole; yet they cannot be entirely excluded from the effective national territory. Nor can the importance of the sertões in the evolution of Brazilian way of living be measured in terms of the convoys of cattle which emerge from them. The typical Brazilian attitude toward the land, the feeling of futility that frustrates all attempts to advance to a more intensive form of land use and relegates the concepts of the conservation of resources to the realm of academic theory—these attitudes have developed in the presence of the sertões, and these attitudes condition the relation of people to the land even in the centers of Brazilian civilization, even in the great cities.

These generalizations do not constitute a criticism of Brazil or of Brazilians. In fact, the achievement of the Portuguese Americans in building a civilization of their own when considered against this background of vast area is recognized as a major accomplishment, and one which justifies the belief that among all the nations of Latin America Brazil possesses the greatest possibilities of future development. During the past four hundred years Brazil has struggled with an unbroken circle of cause and effect relations: a sparse population in the midst of vast area leads to a continuation of the speculative economy, to destructive exploitation, and to lack of stability; and exploitation and lack of stability lead to a continuation of the condition of sparse population. Brazil is one of the few parts of the world which, in terms of the present world economy, needs more people. A great flood of immigration, furnishing the man power necessary to develop a "westward movement" might break the circle and support the kind of chaotic development which led to the settlement of most of the United States between 1870 and 1914.

In recent years such a flood of immigrants could not have been welcomed to Brazil without serious danger; and the Brazilian leaders are inclined to favor a slower and perhaps, in the long run, sounder spread of settlement over the interior. In the meantime, the Brazilian economy remains speculative, exploitive, and unstable.

THE BRAZILIAN ECONOMY

Sugar, gold, and coffee have, in turn, ruled Brazil. To a lesser degree several other products—rubber, for example—have gained places of prominence, but these other products either have not been important enough, or have not remained important long enough, to enable their producers to exert a powerful influence on the affairs of the nation as a whole. Each of these three ruling products has, one after the other, dominated a period of economic history, and each has supported the settlement of a different region.

Exports

Since the last days of the Empire, coffee has been Brazil's leading export product; and during this period Brazil has maintained her position as the world's leading coffee producer. In 1938, of all the coffee exported from Latin America, 57 per cent, in value, was produced in Brazil. The relation, however, of coffee shipment from Brazil to the shipment of other Brazilian products has been changing: in 1928 coffee made up 71 per cent of the total value of Brazilian exports, but since 1936 it has accounted for less than 50 per cent, being only 45 per cent in 1938. This decrease in the proportion of coffee exports is the result not of a decline in the volume of shipments, but rather of a decline in coffee prices and also of a marked increase in the value of other exports. In 1938 Brazil exported over 17,000,000 bags, which was the largest amount in more than a century. The actual volume of production, then, has not declined and, in spite of the program of coffee destruction, huge stocks still fill the warehouses of São Paulo State. Nevertheless to a greater and greater degree other products are increasing in relative importance.

Cotton, which has been the second export product of Brazil in terms of value since the end of the rubber period, has never been one of the country's economic "rulers." Cotton, unlike sugar, coffee, and rubber, did not enter the world market as a new product of which Brazil held a virtual monopoly. Cotton growing in Brazil has brought prosperity only in those years when other sources of supply in the world have failed.

Brazil has played the role of a marginal producer, whose participation in the world market becomes possible only when areas of cheaper production cannot meet the demand. During the last half of the eighteenth century, Brazilian cotton, coming almost entirely from the Northeast, held a place of importance on the European market, but a decline of cotton prices during the early part of the nineteenth century, resulting from the increasing shipments from regions where the costs of production were lower, forced the Northeast out of the market. Brazilian cotton was again in demand when the Civil War in the United States curtailed production from the "Cotton Belt." The peak of production at this time came in 1871-72, when 362,130 bales were exported from Brazil, with the Northeast accounting for over 350,000 bales, or about 96 per cent. This figure was not reached again until 1934. During the First World War high prices resulted once more in an increase of cotton growing in Brazil, this time in São Paulo State. In one of the war years São Paulo's share of the Brazilian production was over 50 per cent. Since 1930 the share of the total accounted for by São Paulo has varied from about 30 per cent to nearly 50 per cent. In the periods when Brazil's cotton could not penetrate the international markets, it did find a slowly increasing market in the textile factories of São Paulo. When the United States adopted a policy of cotton restriction in the 1930's Brazil again entered the world markets; in 1938 cotton made up 18 per cent of the value of all exports, and in that year Brazil accounted for 70 per cent of the cotton exported from Latin America. Only in a country of easily shifted agricultural patterns, a country in which agriculture is carried on principally by tenants on large estates, could such great movements in and out of production take place without severe financial dislocations.

The remainder of Brazil's list of exports is a long one, and each of the items accounts for only a small proportion of the whole export trade. Third in terms of value is cacao, with 4.2 per cent in 1938. After cacao, come, in turn, hides and skins (4.1 per cent), oranges (2.2 per cent), Carnauba wax (2 per cent) and many small items making up some 24 per cent.

In the purchase of Brazilian products the United States has long been in the lead. More than half of Brazil's coffee finds its market there (54.7 per cent in 1938). After the United States, but with much smaller purchases, come France, Germany, and other European nations. None of Brazil's cotton, however, goes to the United States. As a result of the increase of cotton exports from Brazil, the proportion of her exports going to the United States has dropped. In 1938 the United States took

34.3 per cent of Brazil's exports, Germany 19.1 per cent, and Great Britain 8.8 per cent. Germany made big gains in that year because of the barter arrangements by which machinery was exchanged for cotton.

Imports

Before the First World War Brazil's imports consisted of coal and a great variety of manufactured articles. The great expansion of the industries of Brazil during the last two decades has resulted, however, in certain major changes in the list of imports. Machinery now stands first on the list, for Brazil possesses neither the equipment nor the skill to compete in machine tooling. In 1938, machinery made up more than 50 per cent of the value of imports. Wheat is now the second item, though for a time it was first. After these two items come iron and steel in the form of rods, bars, sheets, tubes, and rails. Coal and gasoline are still high on the list in spite of heavily subsidized national industries in coal mining and oil refining. There is a long list of lesser items.

The period just before the outbreak of the Second World War witnessed competition between Germany and the United States for first place among the countries sending these commodities to Brazil. While exchange difficulties were handicapping the payments for goods from North America, Germany was ready to barter locomotives for cotton. In both 1937 and 1938 Germany ranked first by a fraction of a per cent, as well as can be judged by computations and estimates of the values involved in the barter arrangements. Nevertheless, the total trade of the United States with Brazil was increased during those years. Germany, in 1938, was credited with 25 per cent of Brazil's imports, the United States with 24.2 per cent. Third on the list, with 11.8 per cent, was Argentina, which was the chief source of Brazil's wheat imports. Fourth was Great Britain, with 10.4 per cent.

Relation of Exports and Imports to Population Centers

Brazil's foreign trade is to a large extent concentrated in a few regions. Of all exports in terms of value in the period 1936–37, 48 per cent came from São Paulo State. Most of the exporting was through the port of Santos. Only 11 per cent was exported through Rio de Janeiro, and 7 per cent (mostly cacao) through Salvador. The import trade, on the other hand, is mainly concentrated in Rio de Janeiro (41 per cent) and Santos (38 per cent); the third port is Rio Grande do Sul with only 5 per cent.

There are two main reasons for this concentration of the imports at Rio de Janeiro and Santos. In the first place, in the federal capital and in São Paulo and its hinterland live the majority of the Brazilians who can buy things from abroad. Here are the chief markets for locomotives, for industrial machinery, and for automobiles; in these cities are most of the people who eat white bread; in Rio de Janeiro and São Paulo are most of the new buildings which require such construction materials as re-enforcing rods and beams—though some are also found in Porto Alegre. In the second place, Rio de Janeiro has become the chief distributing point from which imported goods are shipped by coasting steamer to the other parts of the country, from Rio Grande do Sul to Manaus.

Domestic Trade

Rio de Janeiro is the hub of internal trade. Of the goods exported by coasting steamers for Brazilian destinations in 1937, Rio de Janeiro accounted for 30 per cent; and of the goods imported from other Brazilian ports, Rio de Janeiro received 19 per cent. As long as Brazil's areas of concentrated settlement remain near the coast, the continued supremacy of Rio de Janeiro in terms of domestic trade would seem to be assured.

No other Latin-American country can look forward to such a continued development of domestic commerce as Brazil. This estimate is justified not only because of the relatively large number of people within the limits of one political unit, but also because of the great variety of resources and products which exist within Brazil's vast area. Potential products range from those of the tropics to those of the middle latitudes; and from those of the farm and ranch to those of the mine and the factory. The adoption of protective tariffs has increased the internal exchange of goods, and the abolition of state export duties in 1930 has still further aided the free flow of commodities from one part of the country to another. Nearly half of the coastwise trade in 1936 consisted of manufactured articles; about a third was made up of foodstuffs; and the remainder comprised various raw materials and livestock. Any movement leading to an increase of the purchasing power of the rural Brazilians would have enormous repercussions on the growth of domestic trade and domestic industries.

Probably Brazil must be listed among the very few countries in the world still possessing opportunities for the expansion of industries

based on the exploitation of still essentially untouched resources. The extraordinary material growth of the United States was produced by the simultaneous expansion of urban industries and the spread of the farm frontier. In the United States the frontier has practically disappeared, and the economic structure of the nation now demands readjustment to the needs of a country which has passed beyond the pioneer stage. But Brazil still offers some of the best opportunities for pioneer expansion to be found anywhere in the world. No westward movement, however, on such a scale as that which spread North American civilization across a continent, can take place in Brazil without a very great increase in immigration.

IMMIGRATION PROBLEM

Brazil, therefore, is faced today with no problem of more fundamental significance than the problem of immigration. Since 1822 a little more than 4,600,000 foreigners have come to Brazil, about half of them to remain. This figure places Brazil second only to Argentina in numbers of immigrants in Latin America. The following table shows the national composition of the immigrants:

IMMIGRATION INTO BRAZIL BY PRINCIPAL NATIONALITIES*

1822 to 1937

Nationality	*Number of People*	*Percentage*
Italians	1,502,958	32.6
Portuguese	1,394,156	30.3
Spanish	595,002	12.9
German	222,951	4.9
Japanese	180,359	3.9
Russian	116,398	2.5
Others		12.9

The figures in this table have been greatly modified in the more recent period. The Italians have dropped far below their previous position, and the Japanese have moved up to first place because of the large numbers coming between 1920 and 1935. The following table presents the immigration statistics for two periods—between 1920 and 1930, and between 1931 and 1937:

* Figures from the Pan American Union.

AVERAGE ANNUAL IMMIGRATION INTO BRAZIL OF SELECTED NATIONALITIES BY PERIODS*

Nationality	*1920–1930*	*1931–1937*
Japanese	6,578	11,387
Portuguese	29,150	7,461
German	7,271	2,236
Italian	10,099	1,856
Polish	2,977	1,684
Spanish	7,741	1,211

Control of Immigration

Of all the various peoples who came to Brazil before 1914, few brought with them such strong feelings of national sentiment that they could not accept loyalty to a new flag. But since the First World War national feeling has run high, and immigrants, especially from Italy and Germany, have been filled with such strong patriotism that assimilation in the Brazilian pattern would seem most difficult. The Brazilians feared the undigested alien groups. In 1934, therefore, a policy of immigration restriction was established; and a new and carefully restated code governing the arrival of foreign immigrants in Brazil was adopted in 1938.

The new code not only limits future immigration in proportion to the nationalities already represented among the Brazilian people, but it also greatly restricts the arrival of people who would elect to stay in the cities. The quotas are assigned in proportion to the total number of immigrants of any one nationality who entered the country between 1884 and 1933, but no nation is given a quota of less than 3,000 a year. The system is quite flexible, however, for quotas can be shifted from time to time by action of the commission in charge of immigration. The code also states that 80 per cent of each quota must be made up of farmers or rural technicians and that these must remain in their rural occupations for at least four consecutive years after their arrival. As a matter of fact, the recruiting of farm immigrants is a very difficult matter, for most people, other than refugees, who desire to come to the New World, whether to North or South America, hold pecuniary gain as a primary motive. As long as pecuniary gain is attractive in rural pursuits, as when many small proprietors have an opportunity to pocket the increase of land values resulting from the progress of settlement—the unearned increment—immigrants may be willing and anxious to become farmers. But when the

* Figures from the Pan American Union.

unearned increment is taken by the large landowners, or has already been taken by the first generation of owners, pecuniary gain must be sought chiefly from the wages of urban industries. Most of the immigrants desiring to come to Brazil before the beginning of the Second World War wished to remain in the large and growing cities; to get them permanently into rural pursuits was so difficult that labor shortage remained chronic on the coffee fazendas of São Paulo State. Only the Japanese and some of the nationalities of eastern Europe (Lithuanians, Russians, and Poles) furnished immigrants who chose to remain in the rural areas. What the refugees from a war-torn Europe may be willing to do in the future, however, is another matter.

The new immigration code also contains provisions which regulate the establishment of colonies of foreigners in Brazil. In each new pioneer colony to be established from now on, at least 30 per cent must be made up of people born in Brazil, and not more than 25 per cent can be made up of foreign-born people of any one nationality. This part of the code also regulates the teaching of foreign languages in the schools, and prohibits the operation of foreign schools in rural districts. The whole program is aimed at the protection of Brazil from the formation of large alien groups in which the Portuguese language and Brazilian institutions are not predominant. The difficulty is that most Brazilians prefer urban life; they do not wish to become pioneer colonists, or, at best, they are willing to undertake rural pursuits only temporarily and for the sake of rapid profits. Under this code—to say nothing of the effect the Second World War has on the migration of people—no large increase in immigration to Brazil can be expected.

Areas of Potential Settlement

No discussion of the population capacity of Brazil or of the possibilities of pioneer settlement has any validity unless it takes into consideration not only the attitude toward immigration held by the Brazilian government but also the attitudes of the immigrants themselves. Until we know who the settlers are, what their objectives are, what their equipment not only of capital but also of technical knowledge is, what their capacity for rural labor is, and in what kind of economic and social environment they must operate—until we are able to analyze all these factors, we can make no true estimate of the significance of the nature of the land with which the pioneers would have to deal. It may be true that 80 or 90 per cent of Brazilian territory is potentially productive for

farming or grazing under present conditions; but if 80 or 90 per cent of the Brazilian territory, or even half that percentage, were actually utilized, present conditions would no longer exist. A westward movement would not perpetuate the way of living now successfully practiced in the sertão. The statement made by Freise (151) that slopes up to an inclination of 35° may be considered arable presupposes cultivation carried on with a hoe—or even with a pointed stick; but if we think of cultivation in terms of the use of a plow, the proportion of arable Brazilian land must be greatly reduced.

If measured strictly in terms of "present conditions," which will not be changed by the process of settlement itself, the parts of Brazil which can be considered immediately available for pioneer settlement are few. Only in the South are Brazilian-born citizens to be found who are not reluctant to engage in the hard labor of frontier colonization without the hope of speculative gain. There are plenty of Brazilians ready to work hard where the chances of spectacular rewards are sufficiently good; but settlement with this objective has produced only the hollow frontier, not the kind of stabilized population which is contemplated when either Brazilians or foreign students of Brazil speak of pioneer settlement. Three requirements must be met before colonies of farmers can be established in close attachment to the land: first a supply of people who are willing and eager to become permanent rural settlers must be found; second land physically suited to the kind of agriculture they are capable of practicing must be identified and delimited; and third, this land must be made accessible to a market either by all-weather road or railroad. The latter requirement is essential because even those pioneers who may be willing to forego gamblers' chances for quick profits are nevertheless unwilling to bury themselves in a wilderness where they must produce not only food and clothing for themselves, but also tools and machines. The opportunity to sell a steady surplus of products and the ability to purchase the countless little gadgets that today have become more than luxuries are not to be denied modern colonists if their attempt at pioneer settlement is to be successful.

Our discussion of the various parts of Brazil indicates that pioneer lands which satisfy these requirements are by no means easy to find. The most important area of this sort is in the forests of western Paraná and Santa Catarina, and northwestern Rio Grande do Sul. Possibly certain parts, perhaps a large part, of southern Mato Grosso should be included as potential pioneer land. Close to the suburbs of Rio de Janeiro and São Paulo reclamation activities are making considerable

areas of swamp land available for cultivation—a kind of internal frontier zone. Compared with the vast size of Brazil, and considered in terms of the prevailing attitude regarding the inexhaustible possibilities of the land, the total area of potential pioneer settlement is small indeed; yet it is the largest such area in South America, and perhaps one of the largest in the world.

THE BRAZILIAN CITIES

Our study of the different regions of Brazil brings to light the fact that, outside of the expanding colonies of small farmers in the South, the rest of Brazilian settlement is governed by two strongly opposed tendencies: the tendency to excessive dispersal, and the tendency to excessive concentration. One leads to the sertão; the other leads to the city. One causes rural families, even of the chief regions of settlement, to seek places for their homes which are out of sight of all their neighbors; the other causes urban families, even in some of the smaller towns, to have their homes as close together as possible. The complex social and economic factors which produce these tendencies have yet to be investigated; their results on the present arrangement of people, however, may be observed and described.

In a country where so few physical barriers impede the spread of people from the primary centers of settlement, the tendency to dispersal results in a widely scattered population. In most areas today the density of settlement is insufficient either to admit of the enjoyment of anything more than a frontier mode of living, or to provide the human contacts necessary for the evolution of what we may call, for want of a more specific phrase, a civilized society. The only period of Brazilian history when a rural aristocracy was actually attached to the land was the period of the sugar plantations—and the place was the sugar region of the Northeast. Otherwise, only in the cities did the Brazilians concentrate in sufficient numbers and with sufficient density to advance their manner of living beyond the rude conditions of a frontier society. In the larger cities were concentrated the activities and interests derived from a wide extent of sparsely or temporarily occupied land. Whatever there is, therefore, of stability and permanence in each region of settlement is to be found in its urban nucleus. Here the Brazilian way of living reaches its highest or most elaborate expression.

The contrast thus developed between city and sertão has been growing ever more profound. But because there is no geographical separation between political areas which are predominantly feudal and political

areas which are predominantly industrial, it would be difficult to conceive of a Brazilian civil war based on really fundamental issues.

For all their imported ideas, however, the Brazilian cities still eloquently express the basic qualities of the people who built them. If it may be said that the Brazilians are more inclined to poetry than to economics the characterization finds illustration in such uses of public funds as the construction of the Manaus opera house, or the rearrangement of the central section of Rio de Janeiro. If over one of the poorest slum districts of the national capital there blazes forth every night a huge electric sign with the words *Fique rico*, this, too, is an expression of an attitude of mind by no means submerged by the incoming tide of industrialization. The modern period, in fact, is marked by the concentration of speculative fever in these very cities where increasing population, rapid new construction, and rapidly rising land values are bringing new wealth. The cities, viewed in this perspective, offer no small part of the answer to the riddle of empty Brazil.

PART III

MEXICO AND CENTRAL AMERICA

19

MIDDLE AMERICA: INTRODUCTION

THROUGHOUT Spanish and Portuguese South America such strong contrasts exist between countries, even between different parts of the same country, that few generalizations regarding the continent or its people can have much value. Unfortunately many travelers from the United States who may know one section of Latin America well are likely to think of this section as somehow typical of all the other sections. It is true that in the general introduction to this book certain principal characteristics were set forth as themes, but as we have progressed from country to country and region to region it has become apparent that the variations on these general themes are of greater significance than the themes themselves. No more important lesson is to be learned by the people of the United States at this critical period in world history than that in Latin America we are not dealing with a political, social, or economic unit which can be recognized in distinction, let us say, to Anglo-America. The Brazilians could, with equal justice, think of the Western Hemisphere as divided between Portuguese Americans and other Americans. Actually the differences which can easily be observed between the United States and Mexico are no greater than those between Mexico and, for instance, Argentina or Colombia. Not even a sentimental unity exists except that which has been rather superficially stimulated during the past fifty years by the Pan American Union. The gulf of misunderstanding which separates Anglo-Americans from Latin Americans, separates also Latin Americans from one another.

The same principal characteristics which can be applied to Spanish and Portuguese South America apply with equal force in Middle America.[1] In each political unit one can observe the progress of the struggle to establish order and coherence among diverse elements. Order and coherence are difficult to achieve in those regions where a generally sparse population is separated into small, isolated clusters of people, and where the communications between clusters across the scantily occupied territory which separates them are poorly developed. To be sure, many of the political units are simply arranged around one nucleus of concentrated settlement with the political boundaries passing mostly through the empty country between the clusters. Such a simple pattern might be an aid to the development of coherence were it not for the handicap of diversity of race and culture, and of the profound economic and social contrasts which separate the class of large landowners from the tenants or peons who own no land. And in the modern era there is the additional element of diversity which results from the growth of the urban industrial way of living against the background of the feudal tradition.

These principal characteristics are given great variety of expression from place to place and from period to period. We find each country, and each separate part of the larger countries, possessing a definite personality of its own—a personality produced by the specific manner in which the problems of low population density and diversity of land and people have been faced; and a personality which results also from the specific pattern of geographic arrangement in which the elements of land and people have been brought together. Repeatedly we have considered the problem of habitability, insisting that the nature of the people is the fundamental factor which determines the significance of the features of the physical land.

THE LAND

The particular part of Latin America to which we now turn our attention is the long tapering isthmus connecting the southwestern border of the United States with the northwestern border of Colombia. This isthmus is predominantly mountainous; and to the variety of surface features common to all mountainous regions is added variety of climatic conditions and vegetation cover.

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[1] Middle America refers to that portion of the Americas which lies immediately south of continental United States. It includes Mexico, the Central American countries, and the West Indies.

Surface Features

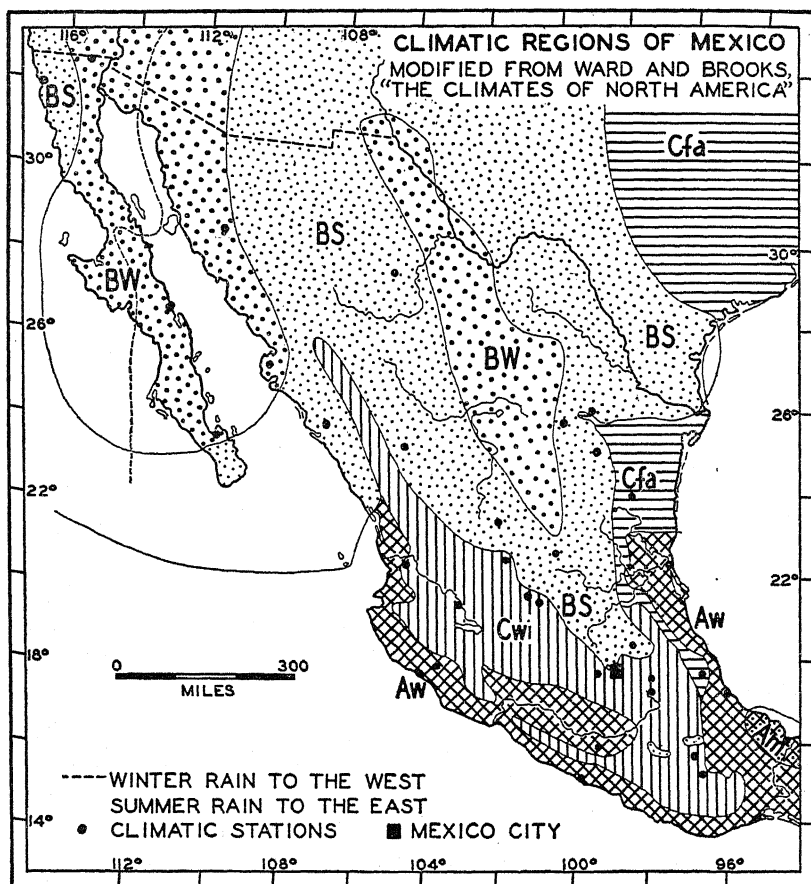
This land connection between North and South America is by no means a simple geologic unit. The idea originally set forth by von Humboldt that Mexico and Central America are formed along one continuous cordillera connecting the Rocky Mountains of North America with the Andes of South America has been shown to be incorrect. The surface features of southwestern North America, which are formed by discontinuous block ranges and structural depressions with a general northwest-southeast trend, continue into Mexico about as far as latitude 20° N. Here the continent of North America, as determined by geologic structures, is sharply terminated by an east-west zone of great volcanoes, many of them still active.

The part of the isthmus which extends from latitude 20° N. to the continent of South America is made up of two distinct geologic regions. The dividing line between these two regions is formed by the continuous belt of lowland which crosses the isthmus diagonally through Nicaragua. To the north of this lowland the geologic structures have a predominant trend from west to east. Along the border of the Pacific the west-east structures are deeply buried under an accumulation of lava and volcanic ash, but on the Caribbean side of the isthmus these structures emerge to form folded and faulted ranges and structural valleys. The west-east structures pass under the Caribbean and reappear in Cuba, Jamaica, Hispaniola, Puerto Rico, and the Virgin Islands, all of which islands belong geologically to the same region as southern Mexico, Guatemala, Honduras, and northern Nicaragua.

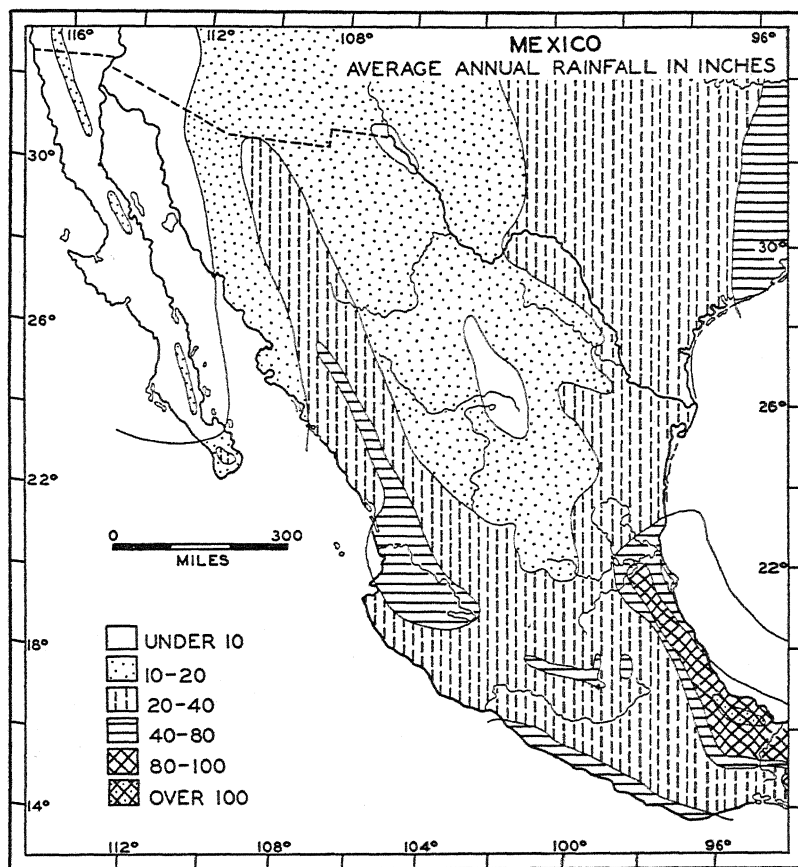
The second geologic region includes the isthmus from the lowland of Nicaragua to the border of Colombia. The surface features of this part of Central America are formed by folded structures, surmounted in a few places by active volcanoes. The structures have a predominantly northwest-southeast trend, bending southward along the northwest coast of Colombia in the Serranía de Baudó (previously described in the chapter on Colombia).

There are few extensive areas of flat country in Mexico or Central America. The one major exception is the limestone platform of the Peninsula of Yucatán, which is related geologically to the limestone structures of Cuba, the Bahamas, and Florida. The rest of Mexico and the isthmus of Central America is very rugged: plains and lowlands occur only as narrow fringes along the coast, or as ribbons along some of the rivers, or as closely encircled intermont basins in the highlands.

Climate

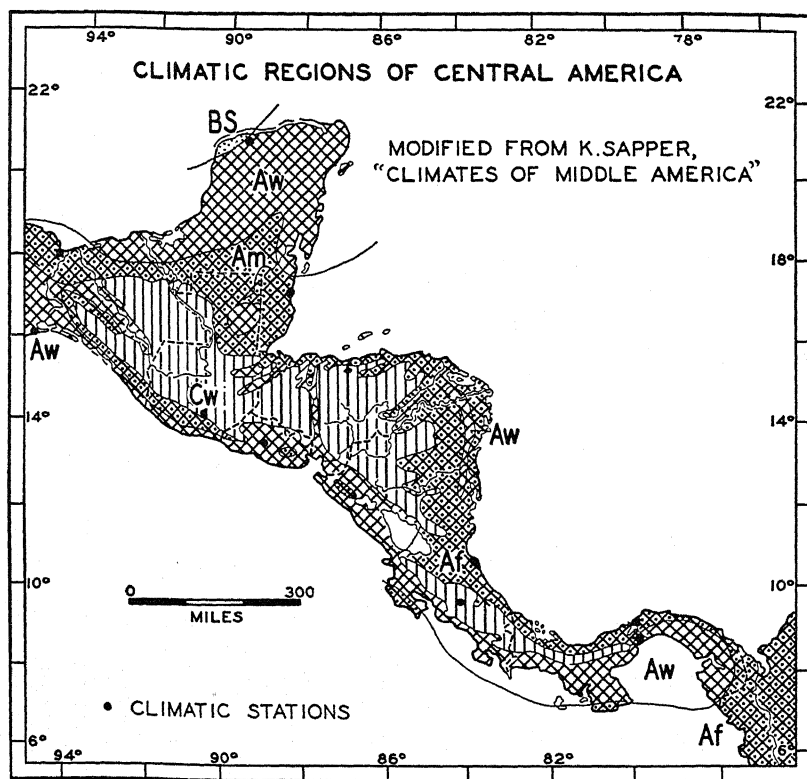
The climatic conditions of Mexico and Central America are controlled by three chief factors. The first of these is the temperature of the bordering seas. In the northwest, from the California line to the southern end of the Peninsula of Lower California, the Pacific Ocean is cold, and

MAP 108

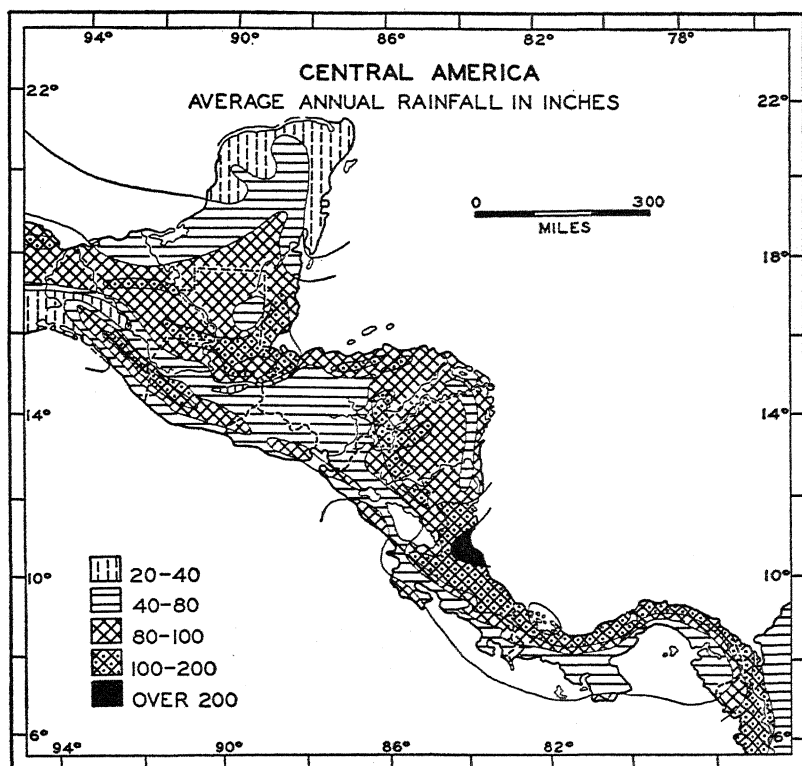
the winds which come onto the land from the northwest not only are chilled by passage over the cold water, but are able to bring with them little moisture. The whole northwest of Mexico is dry, therefore, almost as far south as latitude 20° N. (Maps 109 and 111). Toward the south, however, the water temperature increases, reaching a maximum in the Gulf of Panamá and along the coast of northwestern South America where the Pacific Equatorial Counter Current runs against the west coast

of the Americas. The water of the Caribbean and the Gulf of Mexico is also very warm. The average water temperature at Balboa, on the Pacific side of the Panama Canal, is 80°; at Colón, on the Caribbean side, the water averages 82°. Air passing over such warm water is able to pick up great quantities of water vapor, which is condensed to form clouds and rain wherever the air is forced to rise.

Map 109

The second factor controlling the nature of the climate in Mexico and Central America is the prevailing direction of the wind. The air along the Pacific coast is a part of the great whirl around the North Pacific center of high pressure.[2] It approaches the coast of northern Mexico

[2] For a discussion of the general circulation of air and of the chief wind systems according to the modern point of view, see the footnote and references given on page 172.

from the northwest. As one travels southward the wind comes more from the north and then from the northeast. This general circulation is interrupted by a local monsoon along the equatorward-facing coast from southern Mexico to Panamá. On the Caribbean and Gulf coasts the winds are generally from the east and northeast as far north as the Peninsula of Yucatán. North of this the winds come more from the east and

Map 110

warm Gulf waters. Desert conditions, therefore, extend across northern Mexico all the way to the east coast. Farther south, on the other hand, the winds are onshore rather than parallel to the shore (southeast, east, or northeast), and this part of the isthmus receives copious rains throughout the year. On the Pacific side, south of the belt of cold ocean water, the prevailing winds are offshore from the north and northeast. Only

Map 111

when the local indraught of air takes place during the summer, interrupting the prevailing offshore wind, is there a rainy season on the land. Throughout Mexico and Central America the Gulf and Caribbean side is wetter than the Pacific side.

The prevailing winds and monsoons do not blow without interruption. Cold air masses from the northern part of North America, especially in late winter, move into the Gulf of Mexico and over Cuba or southward into Mexico. These "northers" even cross Yucatán and the Isthmus of Tehuantepec, bringing cool, rainy weather. From Yucatán northward

the east coast is occasionally visited by hurricanes, which bring winds of destructive violence and enormous downpours of rain. It is interesting to note that the continent of South America, rimmed as it is along the Caribbean coast by high mountains, remains a purely negative element in the climate of Middle America.

The third chief control of climate in Mexico and Central America is the mountainous terrain. Slopes oriented in various directions toward the winds and toward the sun have notably contrasted climates. In parts of the same valley one slope may be rainy, another relatively dry; or one slope may receive the sun's rays at such an angle that the heating effect is very great, whereas another slope near by may receive little direct heat from the sun. And within the mountain regions the general decrease of temperature with increasing altitude results in the development of well-recognized vertical zones, similar to those previously described for Venezuela and Colombia, but with altitude limits which descend as one proceeds farther from the equator. The altitudes are sufficient to reach the tierra fría in western Panamá and Costa Rica, in southern Guatemala, and in Mexico. Breaks occur in which the tierra caliente extends from coast to coast in three places: at the Isthmus of Tehuantepec, along the lowlands of Nicaragua, and in eastern Panamá.

Vegetation

All this variety of climatic conditions is expressed in the cover of natural vegetation (Maps 115, 119, and 125). The heavy tropical rain forest occupies the tierra caliente in places where the rainfall is heavy. Where the rainfall is moderate or light the dense rain forest gives way to a semideciduous forest or a scrub forest with scattered openings of savanna. In the tierra templada the tropical broadleaf species of trees gradually drop out and the oaks and other midlatitude species appear. Pines occur in the upper part of the tierra fría as far south as the lowlands of Nicaragua. The large arid and semiarid regions of northern and northwestern Mexico are covered with xerophytic shrubs in which cactus is prominent.

INDIAN CULTURES

A knowledge of the Indian cultures is fully as important as a knowledge of the land in any attempt to understand the present-day problems of population distribution in Mexico and Central America. In parts of Guatemala and Mexico the Indians still form a majority of the inhabit-

ants, and even where mestizo people are more numerous, many of the manners and customs of the preconquest Indians still survive, only slightly modified in their outward forms. Perhaps the most important inheritance is the use of maize as the basic food grain. Some anthropologists believe that the first domestication of this plant was accomplished in the highlands of Central America and Mexico. At any rate, the earliest Indian cultures known in this area based their existence on this American grain. Today, maize is still the basic food of the Mexican people; and because of this fact, as we shall attempt to show, the Mexicans find most parts of their national territory low in agricultural productivity. Associated with the use of maize for food are many other culture traits which have been handed down from long before the time of Cortés: there are the ways of preparing and eating maize, the types of utensils, ceremonies, and even religious practices. From the Indians, too, have come the types of rural houses, certain aspects of the communal land system, the water codes, and many other common elements of the national life of today. All these things combine to condition the attitude of the present population toward the resources of the land, and therefore to endow certain kinds and qualities of land with special significance in human affairs which such lands might not otherwise possess.

In addition to culture traits, the Indian has bequeathed to the modern population another characteristic—the pattern of distribution. In previous sections we have seen that the Spaniard directed the main course of his conquest and settlement to those districts in which the native peoples had already established themselves with more than average density. Knowledge regarding the distribution of the preconquest Indians and their relations to the land is, therefore, essential to an understanding of present distribution. In this reconstruction of Indian distribution the data are not by any means adequate, and authorities in the field of anthropology are still in disagreement over many details (24, 204, 207, and 237).

The Mayas

Perhaps the greatest of all the native cultures of the Western Hemisphere was the Maya—a culture which flourished long before the arrival of the white men, but which has left its impress over a wide territory in Guatemala and Mexico (Map 112). The Mayas were a lowland people: with the Javanese they offer important evidence that an elaborate civilization can flourish in a tropical lowland. The "Old Empire" of the Mayas

SELECTED
INDIAN CULTURES
OF
MIDDLE AMERICA
SERI
TARAHUMARA
YAQUI
MAYO
LIPAN
APACHE
ACAXEE
ZACATEC
CORA
OTOMI
HUASTEC
JALISCO
TARASCO
TOTONAC
MIXTEC
ZAPOTEC
MIXE
ZOQUE
CHOL
LENCA
SUMO
MISKITO
PIPIL
GUAYMI
SAN
BLAS
ARAWAK
CARIB
NEW MAYA EMPIRE
1 MAYAPÁN
2 CHICHEN ITZÁ
3 UXMAL
OLD MAYA EMPIRE
4 UAXACTUM
5 TIKAL
6 PALENQUE
7 QUIRIGUA
8 COPÁN
TRIBES UNDER AZTEC DOMINATION
9 TENOCHTITLÁN
SCALE
0
400
MILES

MAP 112

reached its height between 400 and 600 A.D. Its cities were located in the lowlands of northern and eastern Guatemala, and in the eastern part of the Yucatán Peninsula. The more important cities shown on the map (Map 112) are Copán, Quirigua, Uaxactum, Tikal, and Palenque.

For reasons not fully known the Old Empire broke up, and a "New Empire" was established in what is now the somewhat drier northwestern part of Yucatán. Whether the abandonment of the first centers of Maya civilization was due to a gradual impoverishment of a tropical soil through centuries of intensive cropping by a maize-eating people, or to the spread of yellow fever, or to these things together with a change in the climate, or to other causes, is not known. But it is known that the Mayas abandoned their cities and their fields and migrated northward. The centers of the New Empire included Mayapán, Uxmal, and Chichen Itzá.

In the course of time the New Empire also fell to pieces. Perhaps this was due in part to the political and economic character of the Maya culture. Each city was autonomous, like the city states of Greece; and between the various independent units there was constant warfare excepting when peace was enforced by the Toltec rulers who for a time extended their empire southward from the Basin of Mexico. Although some of the Maya cities were large—probably between thirty and forty thousand people—they were supported by the agricultural production of the lands within a radius of only about twenty miles. In the absence of domestic beasts of burden, transportation was by human porter; consequently the cities were not focal points in a far-flung network of commercial communications, and such commerce as existed was restricted to luxuries rather than staples. In the territory within reach of the cities a shifting cultivation of maize, beans, tomatoes, peppers, yams, squash, and cacao was carried on. To support such a large population gathered together in one place the same fields must have been used with only brief intervals of fallow. In the course of the centuries soil impoverishment and soil erosion may well have brought about the collapse of the Maya civilization.

In many respects the Mayas were an exceptionally talented people. The calendar they had devised was far more accurate than that used by the Spaniards at the time of the conquest. While the Romans were still using their clumsy system of numerals, two other peoples in the world had discovered the use of the zero—the Hindus and the Mayas. The Hindus used a decimal system for counting, which we have now inherited; the Mayas used a vigesimal system. In addition to mathematical and astronomical knowledge they were also skilled in architecture. Although

the arid north. This invasion took place about 1300 A.D. Again, the productive basins of Anáhuac must have seemed well worth the cost of battle, and for the hardy warriors of the dry north, the Toltecs, softened by luxurious living, were no match. It is the story of the Assyrians and the Babylonians retold in this new setting, with no essential detail omitted. On an island in the midst of one of the lakes in the Basin of Mexico, the Aztecs built their capital city, Tenochtitlán; and from this center, they, too, began a movement of conquest which was extended chiefly to the south and east (Map 112). The Aztecs were an aggressive, military people, skilled in warfare, stern, and cruel. They originated few of the culture traits which marked their civilization: mostly they adopted the manner of living of the Toltecs, including many of the customs which had originated with the Mayas. But the Aztecs introduced one peculiarity which set the stage for many of the problems of the modern period: they made use of a system of private property in land. The Aztec conquerors set themselves up as lords supported by the labor of serfs, very much on the pattern of the feudal estates of Europe. It was the wealth accumulated by the Aztecs in their capital in the Basin of Mexico that first attracted the conquering Spaniards.

Other Indian Cultures

In addition to these outstanding Indian peoples of Mexico and Central America there were a great many smaller Indian groups, some speaking more or less related languages, but all different in the details of their manner of living. In general terms, these various smaller cultures fit into three chief categories: sedentary agricultural tribes, shifting cultivators, and nomadic hunters and fishers who practiced little or no agriculture. In the western part of the central area of Mexico, north and west of the area which came under Aztec domination, were the Tarascans and Jaliscans (Map 112), occupying the basins around the modern cities of Morelia and Guadalajara respectively. A corridor of sedentary agricultural tribes, organized politically into small separate states, extended northward along the Pacific slope of the Sierra Madre Occidental. The most important of these tribes were the Cora, the Acaxee, and the Tarahumara. Sedentary farmers occupied spots of land where water was available northward into the southwest of the United States, into the area occupied by the Pueblo tribes. Also in the category of sedentary agricultural people were the Mixtec, Zapotec, and Mixe tribes of southern Mexico, as well as some of the remnants of the Mayas in highland Guate-

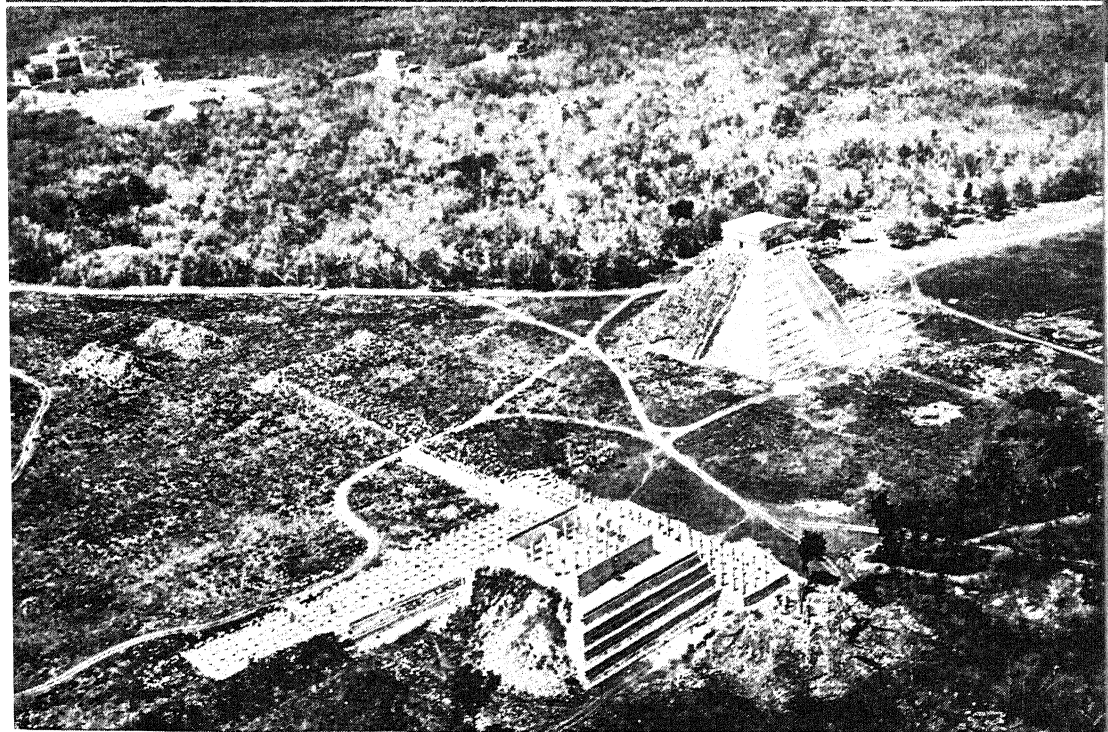
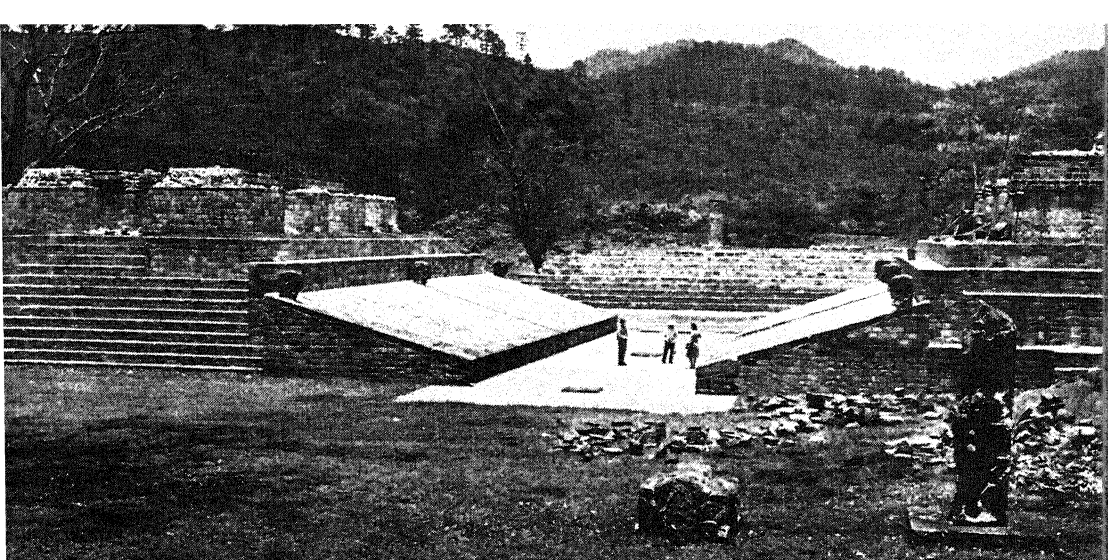
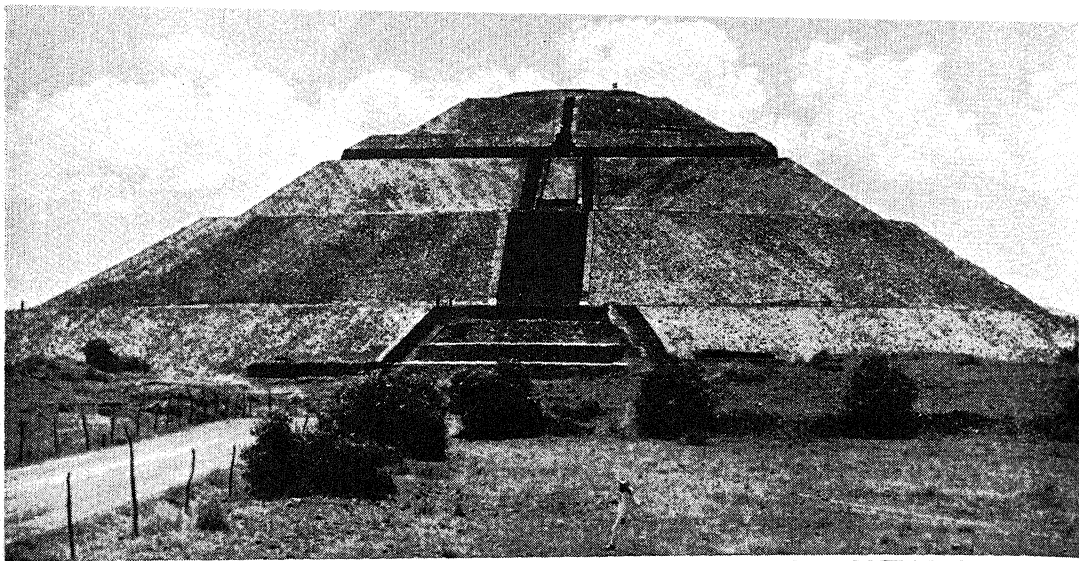
mala. South of the limit of the Maya culture, most of the tribes of Central America were shifting cultivators. In the north and northeast of Mexico, north of the Aztec area, the scanty population was mostly nomadic.

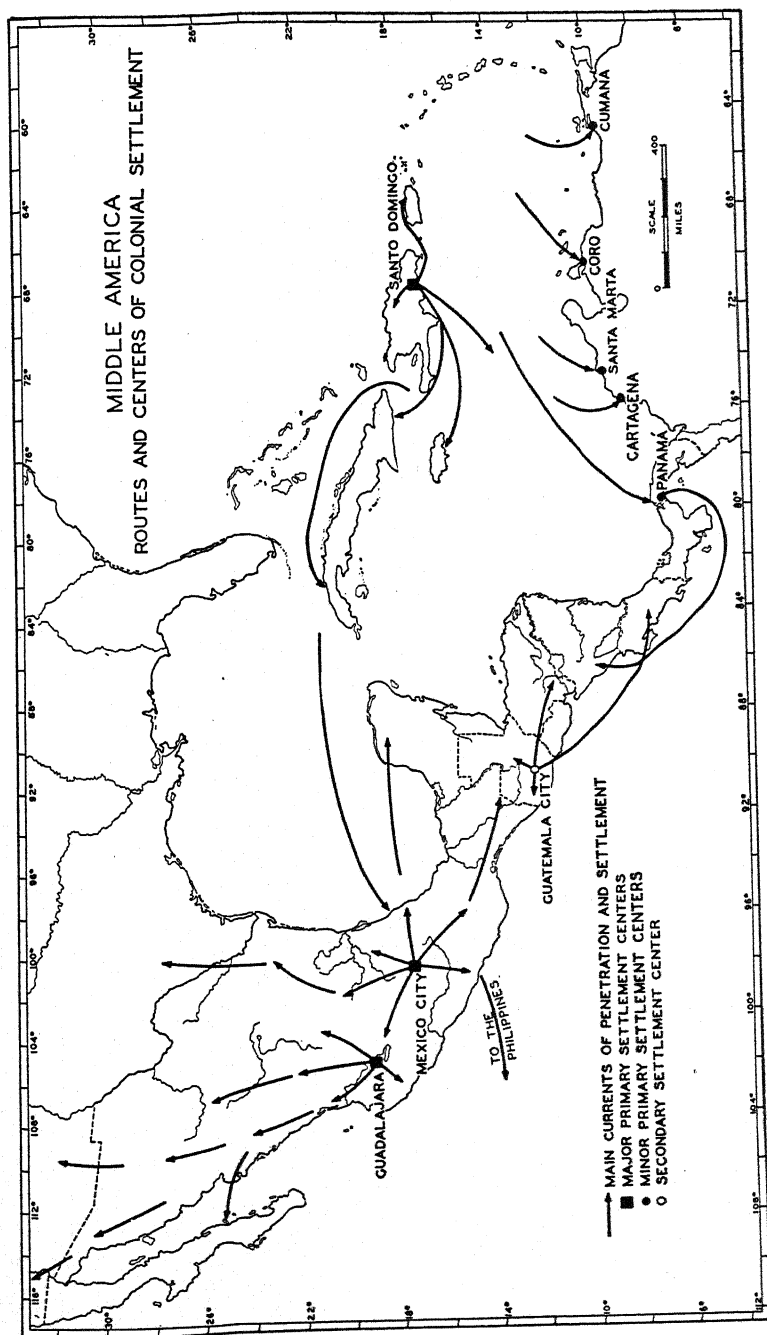
Density of Indian Population

Authorities differ considerably regarding the actual number of Indians in the various parts of Mexico and Central America in 1500. Estimates made by the conquering Spaniards varied widely. Nevertheless, the authorities seem to be in essential agreement regarding the relative density of the Indian population: the only important concentrations of people were in the areas occupied by sedentary farmers; the areas occupied by shifting cultivators had much fewer people per square mile; and the nomadic hunters and fishers had only a very sparse population. The identity of the areas of concentrated Indian settlement and of the concentrated settlement of the modern period is quite striking (Map 144). The central area of Mexico, parts of the northwest coast, parts of the highlands of southern Mexico and Guatemala held most of the Indians of this section of the Americas, and there were no other spots of comparable density. The present concentrations of people in El Salvador and in the highlands of Costa Rica, to be sure, are relatively much larger than were the Indian populations of these areas. Nevertheless, the present pattern of population corresponds closely to the pattern of Indian distribution.

Kroeber estimates that the Indians of central and southern Mexico, Guatemala, El Salvador, Honduras, and Nicaragua numbered about 3,000,000 at the time of the conquest, or approximately the same number as occupied the area of the Inca Empire at that time (204). These two densely populated areas together accounted for 6,000,000 out of an estimated total of 8,500,000 in the whole Western Hemisphere. All of North America north of the present Mexican border had only about 900,000 Indians in widely scattered groups. Although these estimates are considered by many anthropologists to be too low, the relative densities they suggest probably present a fairly accurate picture.

THE SPANISH CONQUEST

The Spanish conquest of Mexico and Central America was carried out by people whose objectives and attitudes were the same as those who entered South America. To find El Dorado—wealth in the form of

These two photographs illustrate some of the remarkable ruins of the Mayan civilization. The upper picture shows a ball court at Copán in Honduras, near the southern limit of the "Old Empire." The Mayas played a game not unlike basketball, in which they attempted to throw a small ball through a ring. (Courtesy of Pan American Airways.) The lower picture is of *El Castillo* pyramid at Chichen Itzá, in Yucatán, one of the ruins of the "New Empire." Surrounding the pyramid are many temples, courts, and palaces, some not yet excavated. Chichen Itzá, at the height of its development, must have presented an imposing spectacle. (Courtesy of Eastern Air Lines.)

Teotihuacán, on the eastern margin of the Basin of Mexico, was the center of the Toltec culture. The great Pyramid of the Sun, shown in the upper picture, rises 210 feet above the basin floor, and covers nearly 11 acres. The two tiny specks on the summit are people who have made the difficult ascent up steep stairways to gain a view of the surrounding country. The lower photograph is of the palace of Cortez at Cuernavaca. Here the conqueror of Mexico built a mansion which is a fine example of colonial architecture. Diego Rivera's murals depicting the story of the conquest are on the walls of one of the verandas. (Both photos, courtesy of Eastern Air Lines.)

MIDDLE AMERICA
ROUTES AND CENTERS OF COLONIAL SETTLEMENT
GUADALAJARA
MEXICO CITY
TO THE PHILIPPINES
GUATEMALA CITY
SANTO DOMINGO
CORO
CUMANA
SANTA MARTA
CARTAGENA
PANAMÁ
SCALE
0
400
MILES
MAIN CURRENTS OF PENETRATION AND SETTLEMENT
MAJOR PRIMARY SETTLEMENT CENTERS
MINOR PRIMARY SETTLEMENT CENTERS
SECONDARY SETTLEMENT CENTER

Map 113

precious metals already accumulated, or lacking that, some form of speculative production which would bring quick profits—this was the dominant motive. But this motive was not the only one which directed the course of Spanish conquest and settlement. The Spaniards were also deeply intent on establishing their kind of civilization in the New World, and in this respect they differed from the Portuguese. They had a genuine, if fanatical, zeal for the spread of the Christian faith; very early in the course of settlement they founded universities, the first of which was the University of Mexico, opened in 1563; they set up printing presses, and in various ways promoted the artistic and literary life.

The basic motive—that of quick profit and prestige in terms of a feudal aristocratic society—was most readily satisfied where there were large native populations of peaceful, sedentary Indians. Large land properties or mines where there were no Indians could not be turned to productive use. Even the missionaries in the more remote frontiers had first to gather the nomadic Indians together in one place and teach them the techniques of a sedentary life before they could instruct them in the new faith. In Mexico, the Spaniards assumed the ownership of the properties formerly held by the Aztec nobles, and beyond the range of Aztec rule, they created their own large estates. Where the Indians were few, the land was granted by the Crown in vast estates, on which the usual form of production was the grazing of cattle. The distribution of Spaniards, therefore, soon took on the same general pattern as that of the native peoples.

One of the first results of the arrival of the Spaniards was the devastating spread of European diseases among the Indians. In some parts of the Spanish domain the native peoples were almost entirely wiped out within the first fifty years of the conquest. Everywhere the number of Indians was enormously reduced, for even in the sparsely occupied north of Mexico the epidemics raged through the groups newly brought together in close settlements around the mission stations. To such diseases as smallpox or measles the Spaniard had already developed an immunity through previous exposure; for the Indian, these new maladies meant death. All over Latin America the story is the same—the great reduction in the number of native peoples during the early years of the conquest. By the time the surviving Indians had themselves started to develop an immunity, the conquerors found themselves in a land notably lacking in man power for the performance of labor.

Where, before the conquest, the Indians were present in the largest numbers, the survivors of the great epidemics were more numerous—

still numerous enough greatly to outnumber the Spaniards. It is an important fact that relatively few people actually came to Middle America from Spain—only about 300,000 registered emigrants left Spain for New Spain during the whole colonial period.[3] These Europeans intermarried freely with the native Indians, and the result was a constantly increasing number of mestizos. Where the large Indian populations existed before, as in Mexico and Guatemala, we find today the largest proportion of people with Indian ancestors. Where the native populations were scanty, as in Honduras, El Salvador, Nicaragua, Costa Rica, and Panamá, the Indian contribution to the present-day population is a relatively small one.

Primary Settlement Centers

The two great primary settlement centers of Mexico and Central America were both in the central area of the Mexican Highlands (Map 113). Guadalajara was one of these: from this colonial center Spanish occupation spread northward along the western part of the Mexican highlands, and northwestward along the Pacific Coast into the southwest of what is now the United States. The rest of Mexico and Central America, except a few colonies in Panamá and Nicaragua, was settled by people who came from Mexico City, or from the subordinate center, Guatemala city. As capital of the Viceroyalty of New Spain, Mexico City rivaled Lima in the extent of its influence. Its rule was extended southward to the present border between Panamá and Costa Rica, and northward over the greater part of what is now western United States, even as far north as the Canadian border. The political, economic, and social activities of this vast extent of territory all came to a focus on Mexico City. In Central America the Audiencia of Guatemala was set up as a subdivision of the Viceroyalty, with its center in Guatemala City. This place, therefore, became a secondary settlement center, similar to Quito and Santiago in South America. Its authority extended southward to include the highlands of Costa Rica. Panamá was ruled from Bogotá.

Panamá itself played a unique role in the colonial empire of Spain. In a minor way it was a primary settlement center, from which Spanish expansion took place. From Panamá came the colonists who founded the towns in Nicaragua; and from Panamá the conquest of Peru was launched. But after the founding of Lima, Panamá assumed the role

[3] Registered emigrants were heads of families. They were often accompanied by servants and retainers.

of a pass city, controlling the route across the Isthmus. Its strategic and commercial importance in the colonial period was very great, since all the legal communications between Spain and the western part of South America even as far as the remote eastern piedmont of the Andes in Argentina passed across the Isthmus at this place.

With this general survey of the conditions at the beginning of the Spanish settlement of Mexico and Central America we may now turn our attention to the several separate political units which have emerged in the modern period.

20

ESTADOS UNIDOS MEXICANOS

Total area, 758,258 square miles

Total population, 19,848,322

Capital city, Mexico City; population, 1,229,576

Trade per capita:

Imports: $ 6.63
Exports: $11.24

Unit of currency, peso ($0.4985 = par equivalent prior to Aug. 28, 1936
.2176 = exchange equivalent, July 10, 1941)

Major commercial products in order of value:

petroleum	copper
gold	henequen
silver	coffee
lead	bananas
zinc	chickpeas

Railroad mileage, 14,220

(The above statistics except when noted are for the year 1938.)

20

MEXICO

MEXICO is still another Latin-American country in which the establishment of a coherent society has proved remarkably difficult. We in the United States need assume no air of superiority, for we have never had to face the problems of establishing order between social groups with such fundamentally different ways of living as those of the Indian and those of the white man. For four hundred years Mexico has struggled with the results of the impact between the Spaniards and the relatively advanced Indian societies already well established on the land. Yet even today formidable barriers separate the people who are predominantly Indian from the people who are predominantly Spanish. Although the Europeans have gained the political supremacy, the cultural importance of the Indian is so great that one writer, at least, has protested against the use of the word "Latin" to describe such a civilization (35).

The contrast in way of living between the Indian and the Spaniard has been augmented by the social gulf which separates the landowner from the landless peon. Not even in Chile has so large a proportion of the land been brought under the ownership of so small a proportion of the people as in Mexico. The system of land tenure characterized by the hacienda with its peon workers was carried to such extremes during the Díaz regime that by 1910 between 80 and 90 per cent of the heads of rural families owned no land—and this in a country which was, and still is, primarily agricultural!

Recently, as in some other Latin-American countries, a new and even

more profound line of cleavage has been created in Mexico. The rapid growth of large-scale manufacturing industries and of communities in which a majority of the inhabitants have adopted the ways of the industrial society has produced enormous differences between urban people and rural people. This new line of cleavage between the feudal and the industrial cuts across all the older lines which already made the establishment of coherence and unity in Mexican national life so very difficult.

Diversity in the Mexican scene is not a racial and cultural matter alone; it is also produced by the physical land itself. Mexico has a little of everything. In addition to the spectacular snow-capped volcanoes there are rugged surfaces throughout the country where the slopes are so steep that the people who live on them think in terms of "up and down" rather than north, south, east, and west. Two thirds of Mexico is like this. The other third is classed as level, but it includes intermont basins, narrow valley bottoms, coastal lowlands, and a wide limestone plain where solution has produced underground rivers and sinks. There are parts of Mexico so high that the air is cool, even in summer; there are also low-lying regions where the temperature, especially in summer, is very high. About half of Mexico, including the desert regions of the north and northwest, is deficient in moisture; but the other half receives an abundance of moisture.

The Mexican population is notably centralized. This is so whether we regard Mexico as a whole or look more closely at any one of the Mexican communities. The population as a whole is concentrated in one central area in the central highlands, and the outlying districts are occupied by a relatively scanty population scattered in small groups. When the distribution is examined more closely we find that even the central area is not composed of one cluster of people, but of several separate clusters, each with its own urban nucleus, each separated from neighboring clusters by thinly populated territory. The national life focuses on Mexico City; but in a similar way every smaller town and every little village is the focus of life in the community of which it is the center. The dominance of the center over the periphery appears again and again in all phases of Mexican life; and the contrast between the concentrated population of the cities, towns, and villages and that of the thinly scattered rural settlements is very great.

Is Mexico a rich land or a poor land? This question has been argued by extremists on both sides since Cortés first reported to his king that he had found a land of superlative resources. Mexico is a rich land for the mining engineer who encounters little difficulty in locating the ores

where the rivers have done the work of excavation and where the cover of vegetation is scanty. Mexico is incomparable for the tourist who seeks spectacular scenery and who can find something picturesque in poverty. Mexico could be made into a very productive meat or dairy land, for it possesses notable physical advantages for these forms of economy. But for farming, Mexico is a poor land, since so much of its area is either too steep or too dry to be classed as arable. And most of the Mexicans are farmers.

Mexico is not the only country in Latin America in which a diverse people, burdened by a system of large landed estates and landless workers, faces the problems of making a living from a soil of meager productivity. Mexico is not the only land which has been described repeatedly as possessing incredible natural riches, but in which the great majority of the people live in hopeless poverty. But of all the countries in Latin America which are faced by the unsolved problems resulting from centuries of exploitation of landless Indians and mestizos by a minority of predominantly European landowners, Mexico stands by itself; Mexico has started to do something about it.

THE PEOPLES AND CULTURES OF MEXICO

The varied assortment of peoples and cultures that comprise the population and the way of life in Mexico is largely the result of the mixture of Indian and Spanish ingredients. Many millions of Indians were already firmly intrenched on the land in central and southern Mexico at the time of the Spanish conquest. These were the sedentary agricultural groups previously described—the Indian communities whose distribution determined, if any one factor can be said to have determined, the course and pattern of Spanish settlement. The Spanish contribution to the racial make-up of the present-day population has been relatively small. The number of registered emigrants who left Spain during the colonial period destined to enter the territory administered from Mexico City, in New Spain, was only 300,000. Although each registration might include members of the family and servants, the total number of Spanish immigrants to New Spain must have been small compared with the numbers of Indians already in Mexico. Nevertheless the Spaniards possessed the advantage of technical knowledge which assured their political and economic conquest of the much more numerous native peoples. Today Mexico is a strange mixture of Indian and Spanish elements—a mixture which is not only biological, but also cultural.

Racial Composition of the Mexican People

Merely to state that in Mexico, as in other parts of Latin America previously described, one major ingredient in the racial composition of the population is the Indian is to obscure the fact that the Indians themselves were diverse in origin and in culture. While today Spanish is the common language throughout Mexico, it is nevertheless significant that, in 1930, 16 per cent of the total population over five years of age spoke 54 different Indian dialects, classified under 13 different linguistic families (241). Something like 90 per cent of the people of Mexico are Indians of one kind or another. Pure-blooded Indians, however, are estimated to make up only 30 per cent, whereas Indians with some white ancestors make up at least 60 per cent of the total. The people of unmixed European descent comprise probably less than 10 per cent.

These proportions have been changing gradually through the decrease in the number of the people of unmixed ancestry and the increase of the mestizo type. In 1805, the people of unmixed European descent were estimated to make up about 19 per cent of the total. At that time the pure-blooded Indian group was estimated at 40 per cent, and the mestizos at 41 per cent. During the colonial period more than 30,000 Negroes were brought in to work on the sugar plantations and in other enterprises, but by 1805 the number of pure blacks amounted to only about 21,000, or 0.2 per cent of the total. The number of pure-black people today is negligible.

The Indian contribution to the Mexican mestizo is a relatively large one. As in Ecuador, Peru, and Bolivia, the mestizo of Mexico has more Indian ancestors than he has white ancestors. During the whole colonial period, as we have said, a relatively small number of Europeans were listed as departing from Spain for New Spain. Few re-enforcements have come from outside since Mexico became independent. Díaz, to be sure, attempted to stimulate European immigration, and about 11,000 Italians actually came to Mexico shortly after 1878, but by 1890 not more than 5,000 were left. Since then, the number of Europeans who have come to Mexico has been negligible. From a racial point of view Mexico is overwhelmingly Indian rather than Latin.

Growth of the Mexican Population

The growth of the Mexican population has not been rapid. After the decimation of the Indians by diseases introduced as a result of the Spanish conquest, the number of people in the country began slowly to

increase again. In 1805 it is estimated that Mexico had a population of about 5,800,000—probably less than the Indian population of the same territory three centuries earlier. At the same time there were approximately the same number of people in the United States. After 1824 the Mexican population required eighty years to double itself, while the United States, during the same period of time, partly because of its flood of European immigrants, made one of the largest numerical increases that history records. Mexico today is estimated to have about 19,000,000 people, while the United States has passed 130,000,000. These facts are absolutely fundamental to an understanding of the contrast one finds today across the United States-Mexican border.

The slow rate of population increase in Mexico obscures the fact that the Mexican birth rate is extraordinarily high. For the period between 1926 and 1930 it was 43 per thousand. This rate is apparently higher than it is even in such regions of expanding settlement as Antioquia in Colombia, or the southern part of Brazil, although it is equalled and perhaps exceeded in all the countries of Central America except Panamá. Yet in spite of this high birth rate, in no part of Mexico is there an area of expanding frontier around a stabilized core of concentrated settlement.

Two chief facts account for the slow rate of population increase and for the lack of settlement expansion. First is the very high death rate—the highest among all the countries of Latin America. Between 1926 and 1930 the Mexican death rate was 25 per thousand. The rate of infant mortality was especially high: in 1930, for Mexico as a whole, the rate was 131.6 per thousand (which may be compared with the 1930 figures for Spain, 117; for France, 79; and for the United States, 65). In the last few years the infant death rate has been somewhat reduced, but it still remains very high. The fact is that the Mexican people suffer from a variety of diseases caused by poor hygiene and inadequate nutrition. The diseases which are most serious are those caused by the pollution of water and food—diarrhea, enteritis, and dysentery; but respiratory diseases, too, are widespread, especially on the high plateau around Mexico City where the dust from the dried lake bed near the city is a serious menace to health during the dry winter season. Smallpox, malaria, and many other ailments also account for some of the deaths.

The second reason for the slow rate of population increase, in spite of the high birth rate, is that Mexico, during the whole four hundred years of European dominance, has been a country of emigration. During the colonial period Mexico supplied most of the people of pure Spanish descent and the people of mestizo blood who occupied the Philippine

Islands. From the Pacific port of Acapulco many Mexicans set sail across the ocean to this still more distant colony of Spain. In the modern era large numbers of Mexicans have emigrated to the United States. Mexicans today form an important "minority" group in all the border states from Texas to California, and also in some of the large industrial cities of the north, such as Chicago and Detroit. Mexico and Chile are alone among the countries of America in having experienced persistent movements of emigration.

Poor health and emigration both betray the existence of poverty—and poverty among the great majority of the Mexican people is the normal condition of life. Perhaps we must blame the land for its low productivity of essential foods; or perhaps the blame should be placed on the manner in which the Mexicans make use of the land. In many previous chapters we have had illustrations of the principle that the significance of the elements of the land differs with the attitudes, objectives, and technical abilities of the inhabitants. Before turning to a consideration of the characteristics of the Mexican land, therefore, we must attempt to form a picture of those elements of the Mexican way of living which have contributed to a chronic condition of poverty—a traditional land problem.

Attitude toward the Land

In the central area of dense population the traditional attitude toward land is based on a mixture of Spanish and Indian ideas. To a certain extent these ideas were in strong contrast, but in other respects they ran closely parallel. The difference between the communal system of tenure and the system of private property which separates the European and the native Indian groups in many countries of Latin America was less pronounced in Mexico owing to the existence of parallel institutions among the Aztecs and the Spaniards. In at least two ways the Aztecs had developed concepts of the private ownership of land, even though a primitive agricultural communism remained the predominant form of tenure. The lands held by the *calpulli*, or the clan (which is the Aztec equivalent, more or less, of the Inca ayllu), included certain tracts which were owned and operated by the whole group in common, but they also included other tracts which were partitioned among the heads of families and thereafter were regarded as essentially private property. Such lands could be passed on by inheritance. And the second form of private property in land formed an even closer parallel to the Spanish forms: certain of the Aztec nobles had assumed the role of feudal lords, having

the right to the services of the inhabitants of specific communities. Long before the Spaniards came upon the scene a considerable proportion of the Mexican people were bending under the burden of a landed aristocracy.

Nor were the Spaniards unacquainted with the idea of communal land ownership. Although, as we have already pointed out, the large private property was the common form of land tenure among the Spaniards, the typical Spanish agricultural village held title in common to three kinds of land which were definitely excluded from private ownership. There were certain areas operated in common which were devoted to the support of the village government; there were common pastures and woodlands; and there was the open tract, located just outside the village gates, used in common for a variety of activities, but not for raising crops or for grazing animals. This tract was known in Spain as the *ejido*, literally the "way out," because of its location on the way out of the village.

Yet in spite of the existence of these parallel institutions the essential contrast between the Spanish and the Indian attitude toward the land remained enormous. For the Spaniard, the sure road to prestige and economic security was the private estate. Only the very small group of Aztec nobles thought of land ownership as bringing prestige. The majority of the Indian farmers who actually used the land, thought of their little plots of land as belonging to the community, and thought only of producing enough for their own needs. Commercial farming was unknown to the Indians. The few items taken to the local markets provided, then as now, more of an excuse for the producer to take part in the social pleasures of the market place than an element of economic support. If a few ears of maize or a piece of pottery offered for sale should actually be sold early in the day, the Mexican Indian would think of this transaction as a loss rather than as a gain. McBride (226) estimates that the agricultural holdings were small, averaging only a few acres, hardly enough to provide even the bare necessities of food. Land was not held for profit; even among the nobles, the buying and selling of land was unknown.

The Spanish-Indian Impact

The Spanish system of the encomienda did not differ greatly from the Aztec system of tribute. The ruling Aztecs exploited the labor of the people they had conquered, and the Spaniards simply carried on where the Aztecs left off. In many instances the same units were taken over,

a Spanish officer taking the place of an Aztec lord without further dislocation of the system. Cortés himself received from the Crown grants of encomiendas in various parts of Mexico, including 22 villages with a total population of about 23,000, occupying an area of roughly 25,000 square miles. By 1572 there were 827 encomiendas in Mexico, most of them located in the central area between Jalisco and Oaxaca, and in the Maya-area of Yucatán.

The system of the encomienda, however, has not survived to the present day. In its place the grant of large tracts of land by the Spanish Crown gave the owner actual title to the land, not just the right to the collection of tribute. Gradually the encomienda system was given up, and in the course of time more and more of the land was put into private hands. Some of the grants were small ones of less than one hundred acres; but many of the grants were large ones, consisting of many thousands of acres.

The Spaniards also brought certain parts of Mexico under their control through the establishment of missions. Especially on the remote northwestern frontier, the Jesuit, Franciscan, and Dominican orders founded new centers of settlement, and around each center they brought together the Indians from many small scattered communities and re-established them on the land as farmers, teaching new agricultural techniques and importing new crops, and, incidentally, exposing the Indians to the ravages of epidemics.

Present Forms of Land Tenure

Three chief forms of land tenure have become traditional in Mexico. These are the *haciendas*, the *ranchos*, and the *ejidos*. The hacienda refers to the large private estate, which is by far the most important of the forms of tenure. The rancho refers to small private properties, worked by the owners. The ejido refers to the agrarian communities, in some of which title to the land is held in common. In the more remote places a few Indian communal holdings survived the long history of Spanish conquest and have come down to the present-day little changed; but the term ejido is also applied to the new agrarian communities set up during the last twenty years under the program of land redistribution. The term is Spanish; but it refers to a form of tenure which has its roots deep in the Indian tradition.

The hacienda, as elsewhere in Spanish America, represents more than simply a form of private property—it is a way of living, one of the prin-

cipal institutions in the New World produced by what we have called the feudal society. The hacienda is large: by definition in Mexico it is a private property including more than 1,000 hectares (2,471 acres);[1] the average size of rural properties in this class is between 7,000 and 8,000 acres; there are many which exceed 25,000 acres, and not a few which exceed 50,000 acres. By 1823 almost all the land of Mexico was divided into haciendas and ranchos and was owned by about 10,000 people of Spanish descent; and by the end of the Díaz regime in 1910, the concentration of ownership in the hands of a few people was greater than in any other Latin-American country. Since 1910 there has been a movement to return some of the land to the ejidos, yet even today the large property is the predominant form of rural land holding.

The figures from the census of 1930 reveal the situation in the modern period. At that time, only 6.3 per cent of the agricultural area of Mexico was included in the ejidos, and 93.7 per cent was privately owned. Of the private holdings, only 2.2 per cent of the total number were haciendas, but these haciendas included 83.4 per cent of the privately owned agricultural area. Furthermore, only 0.3 per cent of all private properties (haciendas and ranchos) were more than 10,000 hectares (about 25,000 acres) in size, but these large haciendas included 55.8 per cent of all the area of private farms. According to this same census, 70.2 per cent of the economically active people of Mexico were engaged in agriculture, but of these 69.9 per cent were listed as tenants, share croppers, or farm laborers—in other words, people who did not own land. An active program of land redistribution reduced the proportion of landless people during the 1930's: at the end of 1933 Simpson estimated that of all the economically active Mexicans engaged in agriculture, 55 per cent were landless, 27 per cent were members of communities sharing ejidos, and 18 per cent were property owners (241). The predominance of the hacienda, then, has been challenged, especially during the last decade of agrarian reform; but the hacienda is still by far the leading type of rural land tenure in Mexico. During the presidency of Cárdenas, lands were transferred to the ejidos at a much more rapid rate than at any previous time. More than 47,000,000 acres were divided among a million peasants, whereas during the previous two decades only about 20,000,000 acres had been turned over to 750,000 peasants.

Since the Mexican hacienda is, so far as the workers are concerned, a self-sufficient unit and the needs of the inhabitants must be supplied

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[1] Compare with the Chilean hacienda. See page 236.

from the property itself, a variety of kinds of land must be included in it. In addition to irrigated bottom lands where humid crops can be raised, there must be some sections for dryland crops which do not need to be irrigated, and there must be a still larger area available for pasture. Each hacienda needs some woodland. Moreover, since each hacienda builds and maintains its own system of irrigation, it is desirable to control the headwaters of the stream which supplies the water.

The ownership of a hacienda, as we have said, provides two things which every Mexican desires but few can achieve: social prestige and economic security. Because the owner is relatively free from land and labor costs, he is able to profit from the sale of his products, even when transportation costs are high. In contrast to the almost complete self-sufficiency of the average rural worker, the landowners are closely tied to the world of commerce. Loss of economic independence is, of course, more than compensated by a standard of living which is far beyond anything to which the ordinary self-sufficient Mexican can aspire. Foreign travel and education, a home in the national capital, participation in politics and in the exciting social life of the cities—these things belong in a world which remains unknown to the great majority of the Mexican people.

The owners of ranchos do not share either the prestige or the economic position of the large landowners. On the average, the rancho of Mexico comprises seven or eight acres, and is operated by the owner and his family, perhaps with the aid of a hired worker. In a sense the rancho is a small-scale hacienda, but it brings none of the freedom from incessant labor which is enjoyed by the owner of the larger property. The owner of a rancho can make a bare living, if he works hard enough.

The ejido is one of the oldest and also one of the newest forms of tenure in Mexico. Although independent communal villages were all but wiped out by the spread of the hacienda system, the agrarian revolution which began in 1910 resulted in the formulation of a program for the redistribution of land and the creation of new agrarian communities. On the new ejidos thus created, the land is usually subdivided into private properties and partitioned among the heads of families, although in some cases the lands are worked by collective enterprise. The inhabitants of these communities have received varying amounts of political independence, technical assistance, and economic support from the federal government. The program constitutes an important attempt to do something about the agrarian problem.

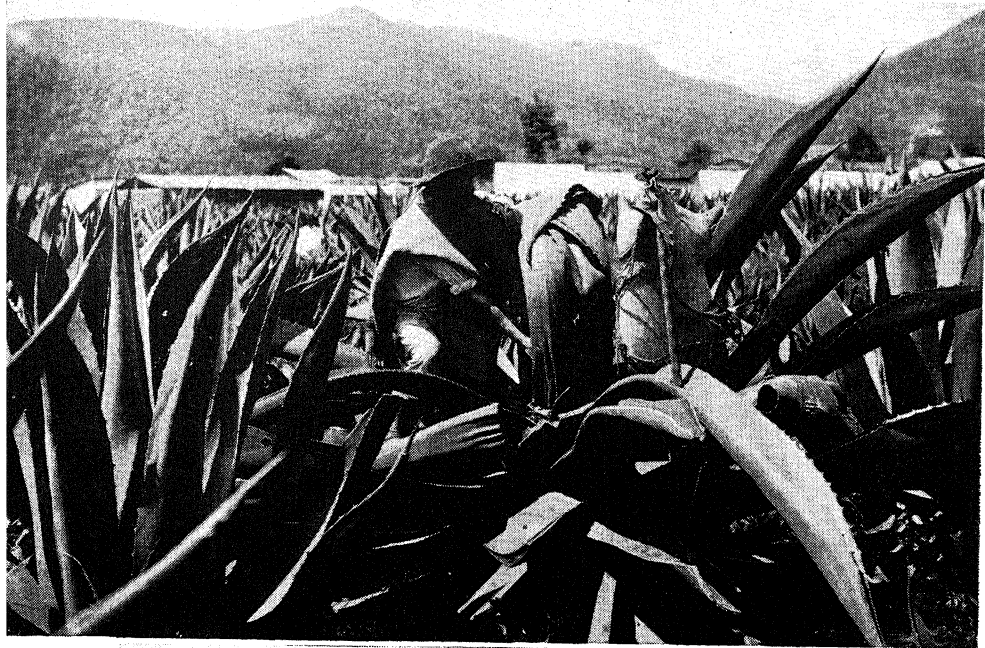
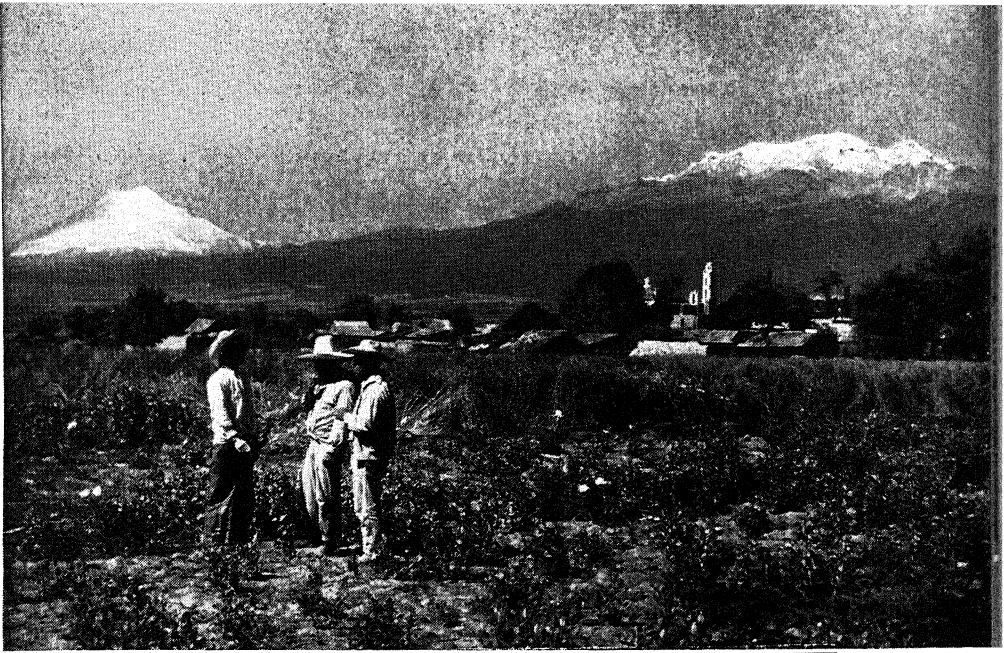
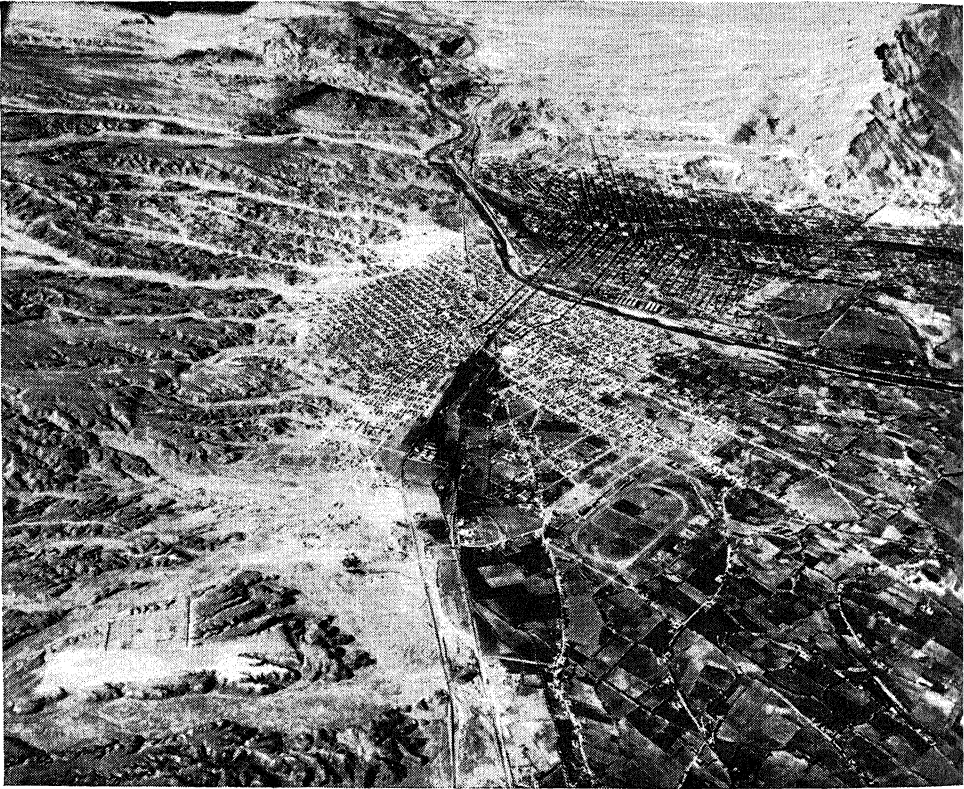
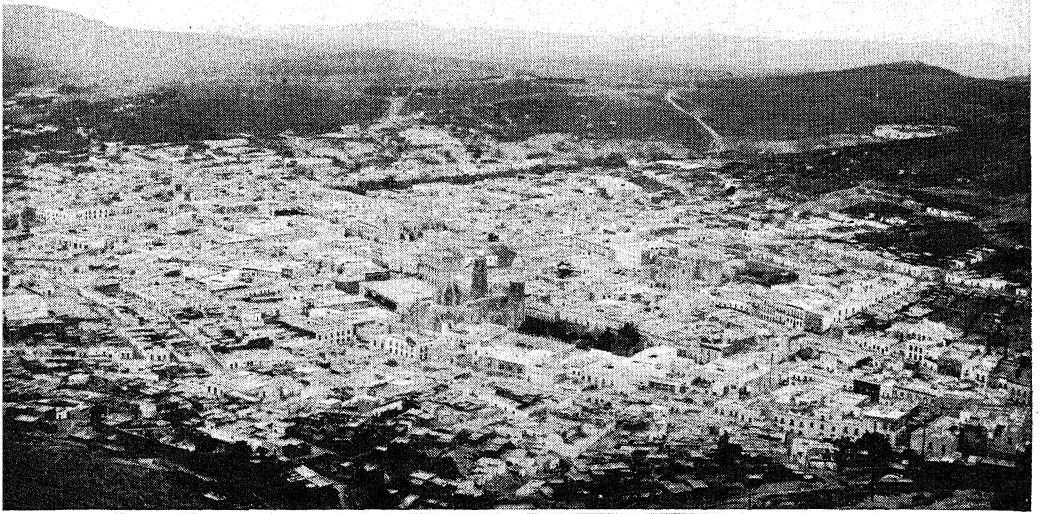
Significant as this program undoubtedly is, the fact remains that the

majority of the Mexican agricultural workers are neither tenants on large estates nor members of agrarian villages. Of the people listed in the census of 1930 as farmers who owned no land, only 1.5 per cent were tenants or share croppers; 68.4 per cent were laborers, most of them peons, attached to their employers by debt bondage. The economic position of the peon has been growing steadily worse since the colonial period: between 1792 and 1910 the rates of payment for agricultural laborers remained essentially unchanged; but during that time the price of maize increased 179 per cent, the price of beans increased 565 per cent, and the price of chile increased 123 per cent (241, p. 37). The contrast between the landowners, who are usually either pure Europeans or mestizos with a predominance of European blood, and the Indian peons has become greater: step by step the rural day laborer has been brought closer and closer to actual starvation.

THE LAND

To what extent is the prevailing poverty of the Mexican farm workers the result of the physical quality of the land? Is the present concentration of the population in the central area due to the special agricultural productivity of that area compared with other parts of the country? When the Spaniards first arrived on the scene they were attracted by the areas which were already densely settled by sedentary agricultural Indians and the outlying regions with their sparse populations were much less attractive. Concentration in the central area was so great that during the Díaz regime (1877–1911) an attempt was made to promote the colonization of other parts of the national territory, but with discouraging results. Is this concentration of people in the central area, then, an inevitable result of the physical quality of the land or an evitable result of the way of living? If we assume that the Indians were led to concentrate their settlements in Anáhuac because of its relatively great adaptability to the production of maize as compared with the arid north, should we also assume that Anáhuac is still, even with European techniques, the region of highest productivity in Mexico? Or is the present concentration of people in the central area out of harmony with the potential productivity of the land? These and other problems cannot be answered until we understand more clearly the nature of the physical background of surface and climate, and until we have examined the conditions of settlement in specific areas.

The Mexican land is one of extraordinary diversity. A large part of

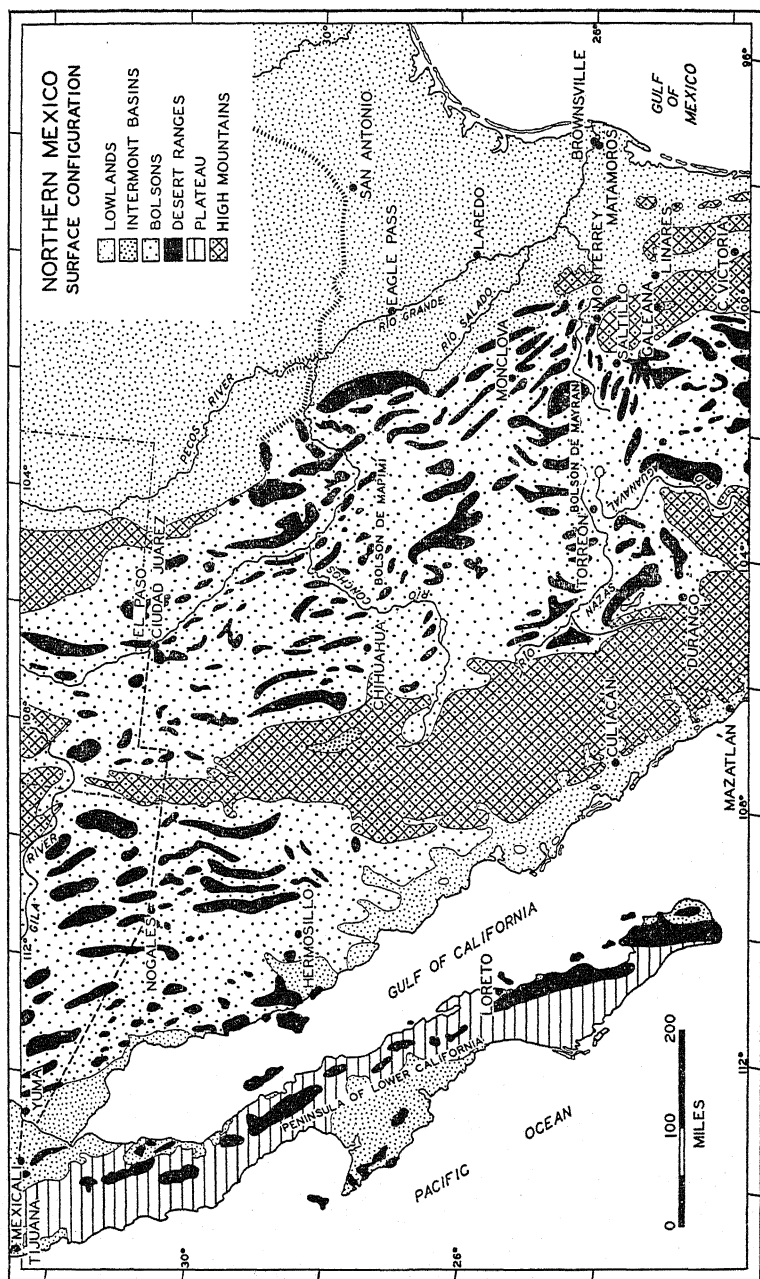
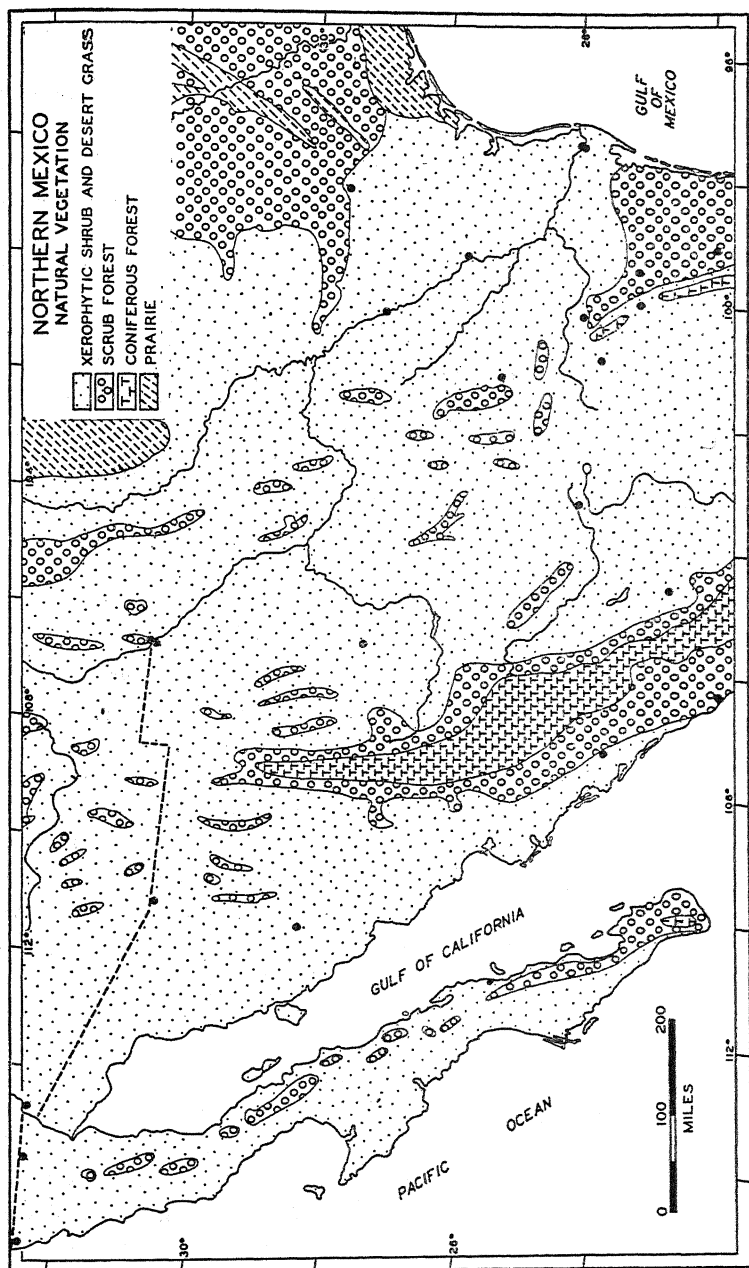
Tampico, built near the mouth of the Río Pánuco, is the center of the Mexican oil industry. In the foreground of the upper picture we see the main part of the city. In the distance are the oil storage tanks; beyond is the Gulf of Mexico. (Courtesy of Eastern Air Lines.) In the lower picture we have a view of the dissected border of the Highland inland from Veracruz. The conspicuous peak in the background is Mt. Orizaba. The little town in the foreground is Maltrata, on the railroad to Orizaba and Puebla. (Courtesy of the Mexican Railway Company.)

The upper photograph shows a worker extracting *agua miel* from the *maguey* plant. The juice is first sucked into a skin bag, and then transferred to large vats where it is fermented to make *pulque*, the popular drink of the Mexican people. The plant produces only for a short period after many years of slow growth. In the lower picture we see a typical rural village in the state of Michoacán. This road was not made for automobiles — little overburdened donkeys do most of the work of transportation in rural Mexico. (Both photos

In the picture above we have a view of the two great volcanic peaks, Popocatepetl on the left, and Ixtacihuatl on the right. The latter, according to an Indian legend, is a sleeping woman, at whose feet her lover, the majestic "Popo," stands eternal guard. In the foreground of the picture is a portion of the Basin of Puebla. (Courtesy of Eastern Air Lines.) The lower picture is of the Indian village of Tamazunchale, long an isolated community in the forest not far from Tampico. Now a stream of tourists passes through on the Pan American Highway. (Photo by Hugo Brehme.)

Above is Zacatecas, an old colonial silver-mining town situated in a small intermont basin in the highlands. Most of the upland here is too dry for agriculture without irrigation, and the land is used for vast cattle ranches. (Courtesy of the Mexican Railway Company.) Below is an air view of the international border between El Paso, Texas, and Ciudad Juárez in Mexico. The river is the Rio Grande. In the foreground is one of the Mexican cotton-growing oases; in the background is the state of Texas. (Courtesy of Pan American Airways.)

the national territory is mountainous, and the mountains include some which have been produced by the erosion of streams in areas of contorted rock structures and some which have been produced by the explosive outburst of volcanic ash and lava. Well over half of Mexico is more than 3,000 feet above the sea; and only about a third of the country can be classed as level. Over all these surface features one finds contrasted types of climate, partly controlled by differences of altitude and partly by relation to the sources of moisture.

Surface Features

The major element of the surface configuration of Mexico is the great highland area which extends from the border of the United States southward to the Isthmus of Tehuantepec and which occupies most of the width of the country (Maps 114 and 118). Although the highland is exceedingly complex in its geologic structure and its surface form, it is convenient for our purposes to think of it as being composed of two chief parts: a *central plateau* and a *dissected border*. The surface of the central plateau is cut by few deep canyons, yet it is by no means flat, for above the moderate slopes of its bolsons and intermont basins stand block ranges and volcanoes. In the north the bolsons are mostly between 3,000 and 4,000 feet in elevation, and the block ranges rise about 3,000 feet above them. South of the Bolson de Mayrán the general level of the plateau rises: the intermont basins are mostly between 7,000 and 8,000 feet, although some are as low as 5,000 feet; and above these basins great volcanoes reach elevations between 12,000 and more than 18,000 feet. The dissected borders of the highland, unlike the central plateau, have been deeply cut by streams. Furthermore, the relief of the western and eastern dissected borders is made more rugged by deep accumulations of volcanic material, so that on these two sides the rim of the highlands is higher than the central part. On the southern dissected border, south of Mexico City, the general highland level between 6,000 and 8,000 feet is preserved, not in the basins, but on the ridge crests, and streams have cut deep valleys below what was once a continuous surface.

The Central Plateau. The central plateau, itself, is divided into a northern section which is lower and drier, and a southern section which is higher and wetter. The bolsons of the northern section are of irregular shape and more or less continuous; their smooth and gentle slopes are formed in part on rock pediments, in part on deep accumulations of sand and gravel washed from the mountains. The block mountains which

NORTHERN MEXICO
NATURAL VEGETATION
XEROPHYTIC SHRUB AND DESERT GRASS
SCRUB FOREST
CONIFEROUS FOREST
PRAIRIE
GULF OF CALIFORNIA
PACIFIC
OCEAN
GULF OF MEXICO
0
100
200
MILES

Map 115

stand above the bolsons are scattered with a general orientation from northwest to southeast. This mountain-and-bolson country is similar to that which is found throughout western Texas, and southern New Mexico, Arizona, and California. At El Paso, on the Texas border, the elevation of the bolson bottom is 3,600 feet; at Torreón, 250 miles south of the border, the elevation is approximately the same. Some of the bolsons are lower than this, but none are higher then 4,000 feet. Most of this part of Mexico, also, is not drained to the sea. Except for the Rio Grande (which the Mexicans call the Río Bravo) and its tributary the Río Conchos, the water in the mountain-and-bolson country escapes only by evaporation.

The southern section of the central plateau, which extends roughly from the Bolson de Mayrán in the north to the edge of the Balsas Valley in the south, is considerably higher and more mountainous than the northern section. Here the mountains are more or less continuous and the intermont basins are separated from one another. The lowest of the intermont basins, the one in which the city of Guadalajara is located, is only about 5,000 feet above sea level. The Basin of Mexico stands 7,500 feet above sea level, and the Basin of Toluca, just to the west of Mexico City, is 8,600 feet above sea level.

This part of the central plateau, like the northern part, is not deeply dissected by streams. Lack of active stream cutting, however, is due to the damming of the drainage by volcanic activity rather than to aridity. Extending from Cape Corrientes on the west coast southeastward to Jalapa and Veracruz is a region which contains one of the greatest arrays of volcanic forms to be observed anywhere on earth. There are new volcanic cones in the process of growth; there are volcanoes which, for the time being, have ceased to be active, and whose sides are being attacked by stream erosion; there are the stumps of old volcanoes, long since quiet; and scattered throughout the area there are all the associated volcanic phenomena—cinder zones, lava flows, accumulations of ash and bombs, hot springs, and—of great interest to the Europeans—mineralized zones where a variety of ores are to be found. Included among the higher peaks are such magnificent cones as Orizaba (18,700 ft.), Popocatepetl (17,887 ft.), Ixtacihuatl (17,342 ft.), Colima (14,239 ft.), and Cofre de Perote (14,048 ft.). The drainage of the area where this volcanic activity is concentrated has been blocked and ponded. In the intermont basins there are many shallow lakes and swamps. This is the region which the Toltecs called Anáhuac — the land on the edge of the water.[2]

[2] Some writers on Mexico describe the northern part of the central plateau as the *Mesa del Norte*, and the southern part as the *Mesa Central* (235).

The streams which drain to the Pacific or to the Gulf of Mexico are actively extending their headwaters into the volcanic basins of this southern part of the central plateau. Several of the eastern basins, northeast of Mexico City, have already been captured by the headwaters of the Río Pánuco which reaches the sea at the site of Tampico. Most of the basins west of Mexico City have been captured by the headwaters of the Río Lerma-Santiago. The country around Puebla and Tlaxcala, southeast of Mexico City, is reached by the Río Atoyac, a headwater of the Río Balsas. None of these headwater streams has been able to cut very deeply into the high country, or even entirely to drain the lakes and swamps of the volcanic basins. Yet only the basin in which Mexico City is located remained, at the time of the Spanish conquest, without any exterior drainage. In the present century, Lake Texcoco, the largest of the lakes which occupied its bottom, has been drained by the digging of a ditch and tunnel across a low divide to a tributary of the Río Pánuco (Map 122).

The Dissected Border. On the east, west, and south the margins of the Mexican highland are deeply dissected by vigorous stream cutting, and here the land seems almost literally to stand on end. On folded and faulted structures the streams have cut steep-sided and narrow-bottomed valleys. Both the western border, known as the *Sierra Madre Occidental*, and the eastern border, known as the *Sierra Madre Oriental*, are composed of deep longitudinal valleys, oriented roughly north and south, where the streams have been able to excavate rapidly along the weaker strata or along zones which have been crushed by faulting. These longitudinal valleys are separated by steep-sided ridges through which the rivers pass in narrow gorges. Neither of these borders offers easy routes of access from the coast to the interior, and the Sierra Madre Occidental is said to be one of the major mountain barriers in the Western Hemisphere. One hundred or more miles in width, and surmounted in places by peaks which reach well over ten thousand feet above sea level, this highland margin is so difficult to penetrate that it forms a distinct separation between the highland proper and the Pacific coast.

The eastern border is also difficult to cross, but it is not so forbidding as the western one. The easiest routes of access to the highlands start from the vicinity of Veracruz in the south and from Monterrey in the north. In between there are only a few other roads or railroads which lead onto the central plateau. The section of the Pan American Highway which connects Laredo on the Texas border with Mexico City climbs from Tamazunchale (394 ft. above sea level) to Jacala (4,593 ft. above sea

level) in a distance of sixty miles, through some of the most spectacular scenery in this hemisphere.

The highland region has also a southern dissected border. This is much wider than the borders on the east and west. Just south of the great volcanic region, the Río Balsas (sometimes known as the Río Mexcala) has opened a deep gulf far back into the highland area. Immediately south of the Basin of Mexico the descent into the Balsas Valley begins. The road from the capital to Acapulco on the Pacific coast first climbs to an elevation of nearly 10,000 feet on the southern rim of the basin. Then it drops down over precipitous slopes to Cuernavaca, only 4,500 feet above sea level. Cuernavaca is only thirty-six miles in a straight line from Mexico City. Directly south of the capital the bottom of the Balsas Valley is only 1,600 feet above sea level: perched on the very brink of this gulf are the giant cones of Popocatepetl and Ixtacihuatl, with snow-clad summits more than 17,000 feet in altitude. In a country of jagged cliffs and narrow ravines, the little villages nestle in the cramped spaces afforded by miniature valley basins, or cling precariously to the slopes. Few places in the world afford such magnificent views.

South of the great valley of the Balsas lies the dissected plateau of Guerrero and Oaxaca. The highland surface, still between 6,000 and 8,000 feet above sea level, is preserved only in a few narrow, even-topped ridges; the streams have cut an intricate pattern of deep valleys, producing a terrain in which very little flat land is to be found. On the few places where the ridge tops are wide enough, or where the valley bottoms open out to form little isolated basins, towns are located and people are concentrated. Such is the location of the city of Oaxaca. This much-dissected southern border is terminated abruptly by a steep escarpment facing the Pacific and the Isthmus of Tehuantepec.

Other Surface Elements of Mexico. Outside of the great highland region with its dissected borders, there are three other surface divisions of Mexico: the block mountains and basins of the northwest; the lowlands of the Gulf coast and Yucatán on the east; and the highlands of Chiapas on the border of Guatemala.

In the northwest, the surface features of southern California continue into Mexico. The Peninsula of Lower California is made up of tablelands and terraces surmounted by a few isolated block ranges with structures similar to those of the mountains east of San Diego. The Sonora desert which lies between the Gulf of California and the Sierra Madre Occidental is a mountain and bolson country, similar to the Mohave of

southeastern California. Even the structural depression which forms the Imperial Valley of California continues southward to form the Gulf of California. Throughout the Mexican northwest rocky surfaces predominate, cut at wide intervals by the steep-sided, flat-bottomed valleys typical of arid lands.

On the eastern side of the highlands, the Gulf Coastal Plain of Texas continues southward into Mexico as far as Tampico, where it is pinched out by the outliers of the Sierra Madre Oriental, and by isolated volcanic necks which stand abruptly above the general level of the plain. South of Tampico the coastal lowland is relatively narrow and in many places is broken by promontories where the highlands extend to the edge of the water. The lowlands bordering the gulf widen out again, however, at the northern end of the Isthmus of Tehuantepec, and the whole of the Yucatán Peninsula is a low-lying plain, interrupted by only a few groups of hills. Yucatán resembles Florida in that it is made up of horizontal limestone formations of relatively recent age. In the limestone, solution caverns have been opened up, and where the roofs of the caverns have collapsed there are shallow sinks, known in Mexico as *cenotes*. The drainage is underground, and there are numerous clear limestone springs.

The Isthmus of Tehuantepec separates the southern dissected border of the great highland region from the *Highlands of Chiapas*. This is the northwestern end of the mountainous region which extends through Central America to the lowland of Nicaragua. In Mexico it is composed of parallel ranges of block mountains, inclosing a high rift valley. Along the Pacific is the crystalline range known as the *Sierra Madre de Chiapas*. Inland from this, and parallel to the coast, is the rift *Valley of Chiapas*, drained by a tributary of the Río Grijalva. On the northeastern side of this valley, there are several other ranges of block mountains, composed of folded and faulted strata and capped with volcanic materials—flows of lava and falls of ash. These mountains are much dissected by streams.

Few indeed are the places in this mountainous land where surfaces of gentle gradient are to be found. And unfortunately, where such surfaces are extensive, the climatic conditions are in one way or another unsuited to the kind of agriculture the Mexicans have wished to practice.

Climates and Natural Vegetation

In a land of such rugged surfaces and of such contrasts of altitude within short distances the climatic conditions and the cover of natural vegetation have extremely spotty and irregular patterns. As in other

mountainous countries, however, there is a general vertical zoning which becomes apparent when one disregards the many irregularities of detail.

Vertical Zones. These general vertical zones in Mexico are similar to those already described in connection with Venezuela and Colombia, but in Mexico the altitude limits of the zones are somewhat lower because of the higher latitude. On the slopes of Mt. Orizaba,[3] near the east coast, the tierra caliente rises to only about 2,100 feet above sea level. As one ascends into the tierra templada the species of trees characteristic of the tropical forests are replaced by oaks and other mid-latitude types. The oaks predominate above 6,000 feet in the tierra fría. The upper limit of broadleaf trees is found at 11,400 feet. Somewhat below 10,000 feet, however, the conifers appear, mixed with the oaks. Above 11,400 feet, up to the tree line at 13,100 feet, the forests are composed almost entirely of fir and pine. The upper limit of trees on Popocatepetl is a little over 12,600 feet. Between the tree line and the lower limit of permanent snow are the alpine meadows (known as páramos in Colombia, where they are much more extensive than in Mexico). The snow line on Mt. Orizaba is found at about 14,600 feet; on Ixtacihuatl the lower limit of permanent snow is about 15,000 feet, but in winter the snow covers the high meadows down to about 13,100 feet.

Temperatures. The contrast between the tropical high-altitude climates and those of the lower altitudes in the middle latitudes has already been stressed. The error of using average annual temperatures to compare different climates is illustrated in the case of the Mexican highlands. Many writers on Mexico have pointed to the fact that the increase in the general altitude of the plateau toward the south has the effect of compensating for the decreasing latitude, so that stations near the border of Mexico and the United States have approximately the same temperatures as the cities at the southern end of the central plateau, around Mexico City. The latter place, located south of latitude 20° N., has an average annual temperature of 60.1°, while El Paso, Texas, has an average of 63.0°. This comparison between average annual temperatures, however, only obscures the contrast in real temperatures between these two places. At Mexico City there is not only a much greater regularity in the daily changes of temperature, but the range between the average of the coldest and warmest months is very much less than the range at

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[3] See the diagram, based on studies by Karl Sapper, in P. E. James, *An Outline of Geography*, p. 327.

El Paso. The comparison between these two places is presented in the following table:

Comparison of Temperature Conditions

	Mexico City	*El Paso*
Average of the year	60.1	63.0
Average of the warmest month	65.1 (May)	81.0 (July)
Average of the coldest month	54.3 (Jan.)	44.4 (Jan.)
Range between the monthly averages . .	10.8	36.6

Incidentally, El Paso, with a range between monthly averages of 36.6°, has a greater difference of temperature between summer and winter than any station in all of Latin America, including the similar latitudes of the southern hemisphere. The difference between a ten-degree range and a thirty-six-degree range spells the difference between a middle-latitude climate and the climate of a place at a high altitude in the tropics. Still closer to the equator the ranges of temperature become smaller until they almost disappear, as at Quito.

The highest temperatures in Mexico, as one would expect, occur at low altitudes in the desert regions. Along the shore of the Gulf of California just north of the Tropic of Cancer, temperatures in the warmest month average above 85°. In the deep valley of the Río Balsas, also, average temperatures well over 80° are encountered. Temperatures on the east coast are not so high, although the humidity, in places sheltered from the wind, may make the air feel hotter.

The lowest temperatures in Mexico are experienced on the highlands. As far south as Mexico City cold air masses (Northers) sweeping southward from northern North America may bring frosts even in midsummer. The destruction of the crops, when such a cold wave occurs, is a disaster to farmers who are at best not far from the margins of subsistence. Cold air masses are more common on the east coast than on the west coast: on the Pacific side, south of the southern border of the state of Sonora, the coast is generally free from frost; on the Gulf coast, frosts occur each year as far south as Tampico. The Balsas Valley is frost-free, although the highlands on either side of it are subject to more than twenty days of frost each year. South of the Isthmus of Tehuantepec there is a small area subject to frosts in the highlands of Chiapas. Even where there are no frosts the cold air masses of winter bring chilly weather to the Gulf coast as far south as Yucatán.

Rainfall. Most of the Mexican territory is deficient in moisture at least for part of the year.[4] The whole northern border of Mexico from the Pacific to the mouth of the Rio Grande passes through arid or semi-arid climates. The very dry sections are in the northwest and in the north-central part. A belt of arid country (BW on Map 108) extends southward from western Texas almost to San Luis Potosí. Semiarid country (BS on Map 108) includes all of the central plateau of the highlands except the southern and the southwestern part—bounded by a line drawn roughly from Aguascalientes to Mexico City.

Climates with a rainy season which is not very rainy and a dry season which is really dry cover most of the rest of the country. The rainy season in Mexico generally comes in summer; but the northern part of the northwest shares with California the climatic regimen of winter rains and summer droughts. The central area receives most of its rain in summer, between June and September, during which period rain falls almost every day and the sky is generally filled with towering cumulus clouds. In fact so cloudy is the summer season in this part of Mexico that the maximum temperatures are experienced in May rather than July (see the climatic data for Mexico City in the Appendix).

Areas where the rainfall is adequate at all seasons of the year occur in only two sections of Mexico. There is one belt of dependable rainfall which extends southward from Tampico along the lower slopes of the Sierra Madre Oriental and crosses the Isthmus of Tehuantepec into the state of Tabasco. The other rainy section is along the Pacific coast of Chiapas, southeast of the Isthmus of Tehuantepec. These two areas together make up only about 12 per cent of the Mexican territory.

Major Divisions of Mexico. In order to estimate the importance of these physical qualities of surface and climate in terms of the distribution of people in Mexico it is necessary to examine the various parts of the country in somewhat greater detail. For this purpose we shall follow the general divisions of Mexico used by the Mexican government in which the different states are put together in five groups or regions. It must be emphasized that these are not natural divisions of Mexico, but follow arbitrary state boundaries: their chief value is that they permit the

[4] An estimate of the relative areas of arid, semiarid, and rainy country in Mexico based on Thornthwaite's classification gives the following percentages of the total area (241):

Deficient in moisture throughout the year	49.9 per cent
Deficient in moisture in the summer	1.4 per cent
Deficient in moisture in the winter	35.9 per cent
Deficient in moisture at no season	12.8 per cent

use of statistics which are gathered and averaged by states. These five divisions with the states included in each of them are listed below:

1. *The North Pacific*
   Baja California
   Sonora
   Sinaloa
   Nayarit

2. *The North*
   Chihuahua
   Coahuila
   Nuevo León
   Tamaulipas
   Durango
   Zacatecas
   San Luis Potosí

3. *The Gulf Coast and Yucatán*
   Veracruz
   Tabasco
   Campeche
   Yucatán
   Quintana Roo

4. *The South Pacific*
   Guerrero
   Oaxaca
   Chiapas
   Colima

5. *The Central Region*
   Aguascalientes
   Jalisco
   Guanajuato
   Querétaro
   Hidalgo
   Michoacán
   México
   Distrito Federal
   Morelos
   Tlaxcala
   Puebla

1. THE NORTH PACIFIC

The North Pacific Region extends roughly from Cape Corrientes to the border of the United States (Maps 114 and 118). Including 21 per cent of the area of Mexico, the North Pacific Region was occupied in 1930 by only about 6 per cent of the Mexican people. Like the west coasts of all the continents between 20° and 30° of latitude this is a desert, and the human settlement is closely attached to the wet spots. On its eastern side it is bounded by the exceptionally rugged terrain of the Sierra Madre Occidental, across which there are few developed routes of travel. From Guadalajara the colonial road, which connected the major centers of Spanish settlement with California and Arizona, descended to the coast in the state of Nayarit, and thence ran northward for the whole length of the North Pacific Region. The present railroad, which connects with the railroads of the United States at Nogales in Arizona, follows this same route. Only the Peninsula of Lower California has remained

isolated from this important line of travel. Unlike the Atacama of Northern Chile, this Mexican desert region has never been the scene of spectacular mining development, although today it is an important source of copper.

The Sierra Madre Occidental

The Sierra Madre Occidental remains one of the least known and most thinly populated parts of Mexico (246). On its eastern side this dissected margin of the highland rises gradually from the general level of the mountain-and-bolson country of Chihuahua and Durango; but the western front of the Sierra Madre is a bold and commanding escarpment, notched at several places by deeply incised stream canyons. Within the mountain area the surface is extremely rugged: steep-sided longitudinal ranges with conspicuously even summits rise to elevations of about 10,000 feet; between them, deep longitudinal valleys connected by short transverse gorges have been cut along the lines of weaker rock by the torrential streams. A luxuriant cover of forest and grass offers shelter and food for a variety of game animals; and from these animals a nomadic hunting people gain a living.

Throughout the course of human history in Mexico, the Sierra Madre has played the part of a region of survival for weaker peoples. The Indians who were able to derive a meager living from the steep, forest-covered slopes, found that these same slopes and forests afforded them protection from their more aggressive neighbors. The tribes of this region not only escaped the exploitation and destruction which was the lot of their more accessible brothers during the Spanish colonial period, but even to this day they have few and only remote contacts with the centers of Mexican life. Within the area of Mexico shown on Map 116 no railroad and no easily passable trail leads from the main part of Mexico across to the Pacific.

Sonora, Sinaloa, and Nayarit

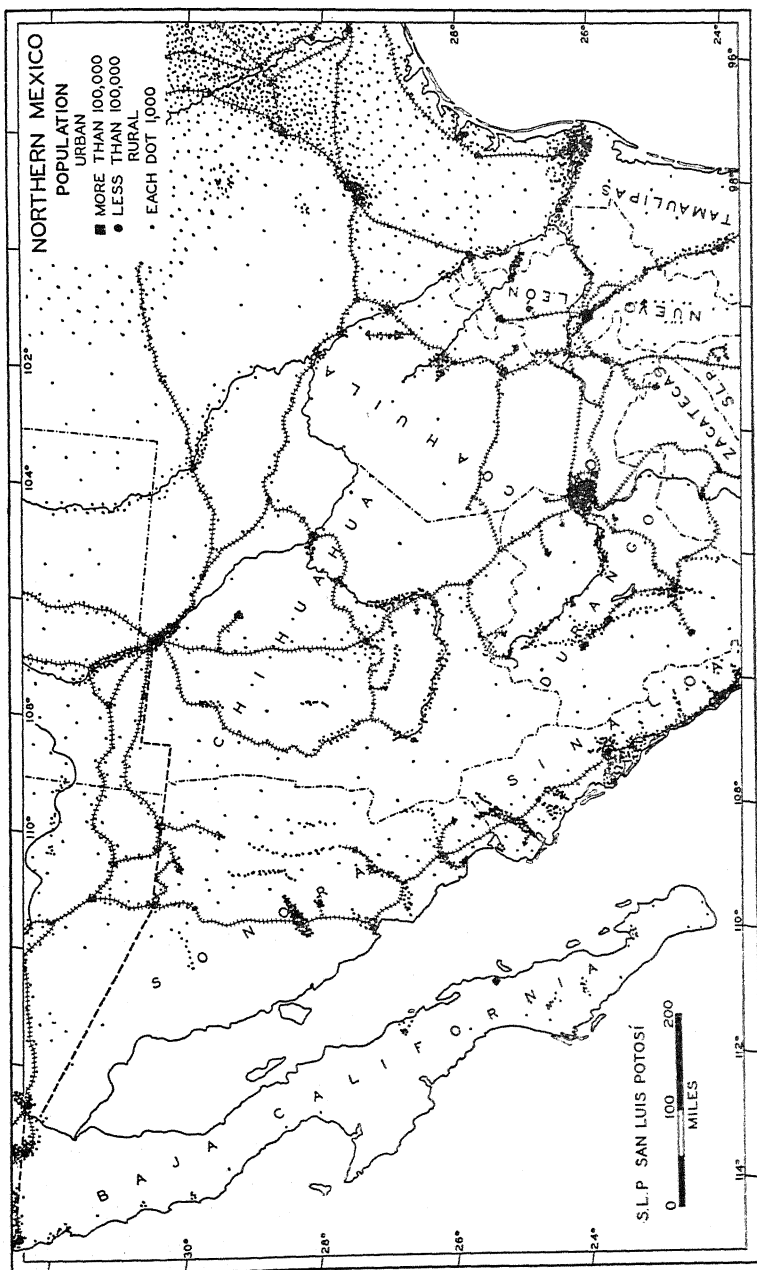
The three states of Sonora, Sinaloa, and Nayarit, west of the western front of the Sierra Madre, descend toward the Pacific Ocean and the Gulf of California through country broken by ranges and basins. A series of terraces and flows of lava have been dissected by the streams descending from the Sierra Madre into isolated mesas and plateaus interspersed with flat valleys. Along the coast there is a lowland which varies in width from less than ten to more than fifty miles. The summers in this

area are very hot and, sometimes, rainy; the winters are mild and very dry. The length of the growing season, the amount of rainfall, and the number of streams bringing water down from the Sierra Madre all decrease toward the north, reaching a minimum along the border between Arizona and Sonora (229).

The distribution of people in this area has changed little since the days before the Spanish conquest. The places where water is available were then and still are the spots of concentrated settlement. The poor nomadic people who have to depend on wild game or on fishing are still few and scattered. When the first Spanish explorers descending from the high country around Guadalajara penetrated the region, they encountered a variety of Indian cultures. A few of the tribes were carrying on intensive agriculture with irrigation. Especially in the south, in what is now Nayarit and Sinaloa, a sedentary farming people were raising maize, beans, and squash on the river floodplains. The population density was not much less than is found in the region today (237).

The Indian population, however, was neither rich enough in accumulated stores of gold and silver, nor numerous enough to attract any considerable Spanish settlement. The sedentary Indians of Nayarit and Sinaloa were divided into encomiendas and plundered by the explorers who first reached them (1530–31); within the first few decades of the conquest these Indians were all but wiped out by the combination of slave raids and the ravages of disease. Exploring parties which marched far to the north, seeking the fabulous cities of Cíbola, failed to discover any dense Indian populations comparable to those of the highlands between Guadalajara and Puebla, or any rich mines of precious metals. Eventually the more accessible southern part of the North Pacific Region was divided into large private haciendas, and the remnants of the Indians were forced to work for their new masters.

A different form of settlement, however, was applied to the more remote country north of central Sinaloa. Northern Sinaloa, Sonora, Baja California, and California were settled by the mission system. The Jesuits were the first in the field, when, in 1590 they started the work of converting and subduing the native peoples of the territory beyond the limits of Spanish settlement. The northern outpost of settlement at that time was Culiacán. The usual practice was to establish a mission at a location carefully selected in advance, and around this mission to attempt to gather together the Indians formerly scattered over a wide extent of territory. Before the arrival of the missionaries, the native peoples lived in small groups; some were seminomadic hunters and

NORTHERN MEXICO
POPULATION
URBAN
MORE THAN 100,000
LESS THAN 100,000
RURAL
EACH DOT 1,000
BAJA CALIFORNIA
SONORA
CHIHUAHUA
COAHUILA
SINALOA
DURANGO
NUEVO LEÓN
TAMAULIPAS
ZACATECAS
S.L.P.
S.L.P SAN LUIS POTOSÍ
0
100
200
MILES
114°
112°
110°
108°
104°
102°
98°
96°
30°
28°
26°
24°

Map 117

fishers, but some practiced sedentary farming with maize, beans, and squash as their chief crops. The Fathers introduced new crops, taught methods of irrigation or adapted the Indian methods, and grouped the Indians into compact communities where they could be instructed in the Christian faith.

Unfortunately, however, the results were disastrous. The crowded settlements were exposed to the spread of contagious diseases imported from Europe: within a very brief period of time the mission settlements were decimated by epidemics of smallpox, measles, and other forms of pestilence. After an epidemic came famine, for whole villages, stricken at the time of planting or harvesting, were unable to carry on the agricultural work on which they depended. When a settlement was so reduced that it could no longer exist alone, it was abandoned and its members were transferred to other mission communities. The land which was abandoned passed into the hands of a Spanish grantee, who used it for the grazing of herds of cattle, horses, and mules. Thus, step by step, the lands on which the Indians had depended for their subsistence became the private property of the conquerors.

In the centuries following the rapid destruction of the Indians which accompanied the northward advance of the frontier there was slow recuperation. Sauer estimates that the native population of what is now roughly the territory of the three states under discussion was at the time of the conquest about 540,000 (237). The population of the same area in 1930 was a little over 750,000. Many of the small agricultural villages which are scattered over the more isolated parts of this area today were first formed around Jesuit missions. Today the population of these villages is slowly returning to the numbers which the Fathers originally gathered about them in the sixteenth and seventeenth centuries.

The economic base on which these people are supported, however, is less satisfactory now than it was when the missions were first established. Before 1910 almost all the good land had come under private ownership. In Sinaloa, for example, in 1930, about 95 per cent of the area was privately owned. Only in the more remote places have the small Indian communities survived, with their traditional communal holdings. Elsewhere the great majority of farm workers are gathered in small villages scattered over the haciendas. Around these villages, areas which are too remote or too poor for the commercial crops of the landowners are devoted to the subsistence crops on which most of the inhabitants of the region depend. With an agricultural base which is smaller now and restricted to poorer lands than in the period of mission settlement, with techniques

of cultivation which have changed little in the last four hundred years, and with low per acre yields of maize, wheat, beans, squash, and chile, the slow increase of population in the region has led to a gradual, and therefore almost imperceptible, decline in living standards. Today most of the communities remain entirely self-sufficient. If near-by mining communities are active, opportunity is offered for income from wages, but when conditions in the outside world force a shut-down of the mines, the laborers drift back again to the small village communities, and the burden of deriving a subsistence from the small agricultural base is increased (220).

Production of commercial crops for the large landowners takes the best lands and the most accessible lands. In the vicinity of Hermosillo, in Sonora state, the irrigated valley bottoms are used for wheat, maize, cotton, and oranges—in fact, the southern part of Sonora is Mexico's chief area of wheat production (Map 114). Farther south, in Sinaloa and Nayarit, the fact that frosts are generally absent permits the cultivation of sugar cane which brings a larger return to the landowners than wheat and cotton. The commercial crops of Sinaloa and Nayarit also include dates, figs, olives, and vines.

In the state of Sonora there are numerous small mining communities, three of which are large enough to appear on the map (Map 116). Cananea produces more than half of Mexico's copper. Nacozari and La Colorada are also copper mining centers. Cananea and Nacozari, connected by rail only with the United States, and owned by North American interests, are in, but hardly a part of, the North Pacific Region.

Baja California

More isolated from the main routes of travel than the area along the eastern side of the Gulf of California is the long narrow peninsula which forms the state of Baja California. The surface and the climate of the northern part of this peninsula are similar to those found in southern California around San Diego. Not far from the Pacific coast a low escarpment marks the first of the terraces which rise step by step toward the east. The underlying rocks are crystalline, and these appear at the surface in several places; but mostly the terraces are covered with sedimentary strata and lava flows. They are surmounted by a few ranges of block mountains, the highest of which reach about 9,000 feet. Although these ranges receive more rainfall than the very dry terrace lands, especially in the south, there is no such abundance of permanent streams as

can be found in the country on the east of the Gulf of California. In Baja California there is, except for the Colorado, only one permanent stream; this is a short one near the southern end of the peninsula. The terraces, therefore, are not so much dissected as those of Sonora; there are vast areas of dry uplands, interrupted at wide intervals by steep-sided, gravel-filled valleys in which surface water appears only after a rain, but where settlement can be supported by wells. All but the southern tip of the peninsula is deficient in moisture; the northern half receives most of the small annual rainfall during the winter, as does San Diego; the southern half receives only summer rains. The winters are mild, and the summers generally cool.

Baja California was settled by the mission system. The Jesuits founded their first settlement at Loreto in 1697, and from this place new settlement spread to the southern end of the peninsula, and northward as far as latitude 30° N. After the Jesuits were expelled in 1768, the Franciscans continued the work of founding missions farther and farther toward the north; and, after an interval, the Dominicans undertook to establish mission settlements in the still unoccupied parts of Baja California (227). The results in each case were similar to those which followed the concentration of the Indians around the missions in Sonora and Sinaloa. Epidemics almost wiped out the native population; many of the mission communities were abandoned, and the survivors were gathered around the few remaining settlements. Most of the small clusters of population in Baja California date back to this mission period.

There are a few small settlements, however, which are of more recent origin. One of these newer developments is the copper camp at Santa Rosalía, founded and maintained by a North American copper company (Map 116). And then there are the border towns, such as Tijuana, which enjoyed a period of hectic prosperity during the prohibition era in the United States. The end of prohibition north of the border was a disaster to these places.

The Colorado Delta and the Imperial Valley

In terms of both physical character and human settlement the delta of the Colorado River and the Mexican part of the Imperial Valley stand out as a distinctly different subdivision of the North Pacific Region. The great rift depression which forms the Gulf of California continues across the border into the United States in southeastern California. Downstream from Yuma, Arizona, the Colorado River enters this rift depres-

sion from the east and has built a huge delta of coarse alluvium in the shallow water at the head of the Gulf. The delta has completely cut off the water of the Gulf from the northern end of the depression which, today, is occupied only by a shallow salt lake. The part of the depression north of the Colorado Delta lies some two hundred feet below sea level, and water escapes from it only by evaporation. This northern end of the rift, lying partly in Mexico and partly in California, is known as the Imperial Valley (223, 224, and 242).

The Imperial Valley is an oasis of great potential productivity. Its importance for the United States is especially great since it is one of the few irrigable areas where temperatures in summer are high and the winters mild, and where, as a result, such crops as long-staple cotton and semi-tropical fruits can be raised. Not infrequently the Imperial Valley is compared with the Fayum of Egypt, a similar oasis which occupies a depression to the west of the lower Nile.

The contrasts to be observed in the forms of land use in the Imperial Valley between the Mexican part and the part which lies in the United States are largely a reflection of differences in accessibility to markets. The Imperial Valley in the United States has relatively low-cost transportation to connect it both to the industrial cities of the northeast and to the large metropolitan market of Los Angeles. As a result of this accessibility to industrial centers and to large urban populations demanding food supplies, the Imperial Valley in California is used for long-staple cotton, and for such perishable truck crops as lettuce and cantaloupes. The Imperial Valley in Mexico, on the other hand, is isolated both by physical barriers and by man-made barriers. Between Mexicali, the chief town of the Mexican part of the oasis, and the centers of Mexican population there are no rail connections which do not pass through the United States. The movement of goods across the international border from Mexico requires the payment of duties which virtually close the markets of the United States to Mexican products. The shipment of products by boat on the Gulf of California from Mexicali to other parts of Mexico is not possible because of the absence of docks, and docks would be very costly to build because of the exceptionally high tides at the head of the Gulf. As a result of isolation, therefore, there is little cultivation of fruit on the Mexican side of the border. Long-staple cotton, alfalfa, and wheat occupy the chief acreages.

Furthermore, there has been a long dispute over water rights on the lower Colorado River. The people in the United States have claimed so much water that only a small and uncertain share has been left over for

the Mexican part of the Imperial Valley. Recently the United States has shown a willingness to exchange water rights on the Colorado for rights on the lower Rio Grande, and it now seems probable that Mexico will be granted enough to irrigate 100,000 acres—a considerable increase over the area hitherto irrigated in the Imperial Valley.

2. THE NORTH

The states which form the region known as the North share with the states of the North Pacific Region two important characteristics: aridity and isolation. More than three quarters of the area included in each of these regions is deficient in moisture throughout the year; and both regions, isolated from each other by the Sierra Madre Occidental, are also remote from the centers of Mexican political, economic, and social life. These regions, taken together, form the remnant of a vast territory, extending almost to the borders of present-day Canada, which was once claimed, but never effectively occupied except in scattered spots, by Spain and Mexico. The North and the North Pacific regions of present-day Mexico were protected from the westward movement of English-speaking people which swept across the northern part of the former Mexican territory by the barrier of aridity and by the trend of the Gila River along which the invaders moved toward the Pacific. At present the railroad, the automobile highway, and the airplane landing fields offer the first important attack on isolation that has been delivered in four centuries.

Still, the North, like the North Pacific, is thinly populated. The international boundary between Mexico and the United States, unlike the boundary between the United States and Canada, passes generally through empty country. Vast empty stretches effectively separate Mexico from the United States in spite of the apparent proximity of these two countries on political maps. The North includes some 40 per cent of the total national territory of Mexico yet it is occupied by only about 19 per cent of the people. Except for a few areas of concentrated settlement, the population density is generally less than six per square mile, and there are large areas with less than two.

San Luis Potosí, Zacatecas, and Durango

The first part of this great northern country which the Spanish conquerors invaded after they had established themselves in the central area between Puebla and Guadalajara was the part now included in the states

of San Luis Potosí, Zacatecas, and Durango. This part of the North is composed of basins and plateaus which stand at about the same altitude as those of the central area in the state of México. The basin of Zacatecas is just over 8,100 feet above sea level. The cities of San Luis Potosí and Durango are both just over 6,000 feet in altitude. The surface between them is composed of expanses of high, semiarid plateaus, with ranges of block mountains standing a few thousand feet above the general level. Most of the streams do not drain out to the sea.

As a matter of fact there is so much similarity between the physical quality of the land in the southern part of the region called the North and the Central Region just south of it, that were it not for the significance attached to certain minor differences as a result of the human occupation a division between them probably would not be made. The Central Region is just a little wetter. On the map of climates (Map 108) the boundary between the BS climates (semiarid) and the Cwi climates (rainy summer) passes just south of the cities of Durango (Map 114), Zacatecas, San Luis Potosí, Querétaro, and Pachuca; it passes just north of Aguascalientes, and Guanajuato (Map 118). Mexico City is almost exactly on the border between the humid and semiarid climates as determined by the definitions of the Köppen system. That one group of cities is classified as semiarid and the other as humid should not obscure the fact that places so close together on either side of an arbitrary climatic boundary are actually very much alike. Anáhuac, the land of lakes, is only a very little wetter than the country to the north; but to a people migrating southward, Anáhuac must have seemed to be a land of plenty.

The first interest of the Spaniards in the days of the conquest was the search for wealth, especially gold and silver. The first places to be established after Mexico City and Guadalajara were mining towns. Within the first half century the newcomers had located the chief sources of mineral wealth and started mining activities. The silver ores near Zacatecas were discovered in 1546 and active mining operations were started two years later. Guanajuato began as a mining center in 1554. The other outstanding silver-mining communities which were founded about this time were Pachuca, Querétaro and Aguascalientes in the Central Region, and San Luis Potosí and Durango in the North.

These sixteenth-century mining towns became the chief political centers, dominating the territories around them. After Mexico gained its independence from Spain they became the provincial capitals around which the new states were organized. But these old colonial towns were more than simply political centers: they were also important for smelting

and refining industries, at first chiefly for the reduction of the silver ores. During the modern period other minerals have been exploited. Zacatecas today produces not only silver, but also gold and copper. Durango produces silver, gold, copper, lead, and also more than half of Mexico's small supply of iron ore.

The chief difference to be observed in the pattern of population as one passes from the Central Region into the North is the decrease in the number of agricultural communities scattered throughout the country around the mining centers. In the North the decreasing rainfall restricts agricultural settlement to the irrigable valleys. The change is not abrupt: San Luis Potosí, southern Zacatecas and southern Durango form a transition zone between conditions characteristic of the Central Region which we shall describe later, and conditions which prevail over the vast dry country farther north.

The Sparsely Settled Mountain-and-Bolson Country of the North

The northern parts of the states of San Luis Potosí, Zacatecas, and Durango, together with most of the states of Chihuahua and Coahuila, are included in the mountain-and-bolson country of the North. The basins, or bolsons, have typical desert landforms. The lower places are occupied by shallow, salty lakes with fluctuating shore-lines, or by salt-encrusted flats. The bolsons are bordered by the gentle slopes of alluvial fans, which only thinly mantle the rock pediments around the base of each range. The ranges themselves, with steep, rocky slopes, stand abruptly above the bolsons.

The basins of this part of the North are much lower than those of the southern border, just described. The big Bolson de Mayrán is about 3,600 feet above sea level at its center; the more or less interconnected series of basins which occupy the borders of Durango, Chihuahua, and Coahuila, and which are known collectively as the Bolson de Mapimí, are only a little over 3,000 feet in elevation; in central Coahuila there is one basin which stands only 1,100 feet above sea level.

Mostly this is a land of interior drainage. The streams which rise in the scattered desert ranges lose themselves in the sandy alluvial fans almost at once when they emerge from the mountain ravines; but the larger rivers which rise in the Sierra Madre Occidental and flow eastward in Durango and Chihuahua find their way well out into the deeper depressions. The Bolson de Mayrán is abundantly supplied with water, for it collects the flow of two rivers, the Río Aguanaval and the Río

Nazas. The two intermittent lakes of the central part of this bolson have surface water in them only after a flood, but at all times of the year, just a short distance below the surface, there is a sheet of ground water which is not salty.

Only the Rio Grande and its tributaries have succeeded in capturing the drainage of certain parts of this mountain-and-bolson country. The large bolson which lies north of El Paso along the border of Texas and New Mexico is drained by the main Rio Grande. Between El Paso and the junction with the Pecos River, the Rio Grande passes through a succession of deep canyons, interrupted by only a few short stretches where the valley bottom widens out and where irrigated agriculture can be practiced. The Río Conchos, a tributary of the Grande, has cut back from the main stream through a deep gorge to the vicinity of the city of Chihuahua, where it taps the drainage coming from the Sierra Madre Occidental.

Almost all of this part of the North is semiarid or arid (Maps 108 and 109). Most of western Chihuahua receives between fifteen and twenty inches of rain a year, with a marked summer maximum. There is a belt of arid climate (BW) which extends southeastward from El Paso across the Bolson de Mapimí and the Bolson de Mayrán into the northern part of the state of San Luis Potosí. Near Torreón in the Bolson de Mayrán the average annual rainfall is only ten inches.

This great northern region was not attractive to the colonial Spaniards. Its scanty, nomadic, warlike Indian population could not compare with the sedentary agricultural Indians of the Central Region as producers of wealth. Nor was the North so rich in precious metals as the country south of Durango. The first settlements were mining communities, but they were fewer and not so prosperous as those farther south. Effective settlement was limited to a few spots. The mission system was applied to this frontier, as in the North Pacific Region, and many of the present towns owe their origin to that form of settlement.

The greater part of the vast area in this region was utilized then as now for the grazing of cattle (Map 116). Especially in western Chihuahua the summer rains support a good growth of grass on which cattle can feed, and this part of Mexico is said to rate high as a natural grazing land. The small communities of Indians scattered throughout the region are located where water is available for irrigation, and the size of each community is roughly in proportion to the area which can be moistened. Many such communities have survived to the present time along the streams which form the headwaters of the Río Nazas.

In modern times the mining activities of the North have been more productive than those of any other part of Mexico. In 1931, for instance, the state of Chihuahua accounted for some 38 per cent of the value of mineral production in Mexico, exclusive of oil. The mines of this state are first in the production of lead, zinc, and gold; but the silver mines are still less important than those of the region farther south. The mining communities, like those of Sonora and Baja California, are mostly small and fluctuating in population—by no means permanent features of the map of population, as are those of the Central Region. Meanwhile, commercial agriculture has also appeared in the North.

The Laguna District

The Laguna District occupies a part of the Bolson de Mayrán. Here the relative abundance of water brought by two rivers creates an oasis of considerable potential value. Although the Laguna District as developed today occupies only a tenth of the 11,000 square miles estimated to be irrigable in the Bolson de Mayrán, this district has become one of the most important centers of commercial agriculture in Mexico, and one of the chief places where the federal government is developing its plan of co-operative farming. Torreón is the chief city of the area.

The history of land tenure in the Laguna District is typically Mexican. Originally the whole Bolson de Mayrán was given to four or five owners in grants from the Spanish Crown. The Laguna District itself was included in an estate which had about 1,500 square miles of grazing land. Not until 1850 were these huge grants subdivided by sale and by inheritance. About this time the use of the irrigated lowlands for commercial wheat farming was started, and for many years this was Mexico's chief wheat district. In the modern period the Laguna District is utilized for the production of long-staple cotton: about half of the land is now used for cotton, about a fourth for wheat, and smaller amounts are planted with subsistence crops of maize and alfalfa (215). The population density is over 125 per square mile. Even as late as the census of 1930, the Laguna area was divided into only 322 rural properties, of which 131 were large enough to be classed as haciendas, and of which only 10 were ejidos.

In 1936 the federal government selected the Laguna District as the site of its first experiment in the development of co-operative agricultural communities. The land in private hands was expropriated in accordance with the provisions of the agrarian code of 1933. On the area thus

made available, 277 ejidos were organized, including a working population of more than 30,000 and a total population of about 150,000. Since 1936 a few additional ejidos have been formed. Each ejido is a self-governing agrarian community, and the members of the community work together on the cultivation and harvesting of the commercial crops, each being paid in proportion to his services. In addition, each family is assigned a plot of ground, amounting to less than an acre, on which to grow subsistence crops of maize and alfalfa. The federal government takes care of the marketing of the crop, keeping 5 per cent of the returns. The government also had to loan the funds to maintain the people until the first crop was harvested, and also to cover the purchase of modern farm equipment. The government has opened model agricultural schools in the area, and supplies farm experts to advise on problems of land use.

It is still too early to estimate the results of this experiment in land redistribution. Considering the poverty of the rural workers under the old system, however, almost any change would be a gain for them, even if that change should fail to achieve the goal visualized by the enthusiastic government workers in charge of the experiment. The Laguna District remains an important area to watch, and may in the future become another area of expanding settlement.

Other Areas of Commercial Farming in the North

In addition to the Mexicali District in the North Pacific Region and the Laguna District just described, there are several other smaller areas scattered through the North where cotton is now the chief commercial crop. These other areas are all along the Rio Grande and its tributary the Río Conchos (215). The first of these is along the Rio Grande just south of El Paso. From Ciudad Juárez (on the Mexican side, opposite El Paso) for about thirty miles along the river there is an oasis on which exceptionally high-grade cotton is raised. Cotton growing was started about 1922, and now covers some 20,000 acres of land.

The second cotton district consists of a series of small areas strung along the Río Conchos. The upper producing areas are near the base of the Sierra Madre Occidental; the lower ones are on the little ribbons of floodplain near the Rio Grande; but most of the cotton oases are in the midcourse of the Conchos, just south of the city of Chihuahua. A large dam on the upper river regularizes the flow of water and has provided for a considerable increase of acreage.

Another area of cotton production has appeared since 1933 along the Río Salado in the state of Nuevo León, southwest of Laredo, Texas. In that year irrigation works along this river were put into operation in a region which, because of its low rainfall, had previously been very thinly populated. The federal government brought settlers to this new oasis, many of them being repatriated Mexicans who had gone to the United States but who were forced to return during the years of the depression. The success of this venture is threatened by the appearance of alkali which results from insufficient drainage and too rapid evaporation on the irrigated land.

Still another area of cotton production has appeared along the Mexican side of the lower Rio Grande, opposite the much larger irrigated area in Texas. Here, as in the Imperial Valley, there is a notable contrast between the two sides of the political boundary. The Texas area is well-known for its citrus fruits and truck crops; but on the Mexican side, in addition to cotton, there are only the usual subsistence crops of maize and beans. Because of the expense of pumping water from the river onto the natural levee (an elevation of twenty feet or more) most of the Mexican cotton of this area is grown without irrigation. The planted area fluctuates, therefore, with the fluctuations of rainfall.

All these cotton-growing oases along the border of the United States and Mexico from the Mexicali district of the west to the oases along the Rio Grande in the east are involved in disputes with the oasis communities of the United States over the water rights. On the Colorado River there seems to be some justification for the prior claim to the water on the United States side, but along the Rio Grande the situation is not so clear. The expansion of irrigated lands in New Mexico above El Paso has permitted less water to find its way to the Mexican oasis just south of El Paso. Here the Mexicans are at the mercy of the people of the United States since the Rio Grande, flowing southward from Colorado, is the only source of water. The situation is reversed, however, along the lower Rio Grande. Here the development of the Texas oasis was dependent on the use of more and more water from the river, but along the lower river the chief tributaries come from the Mexican side. The use of the water of the Río Salado in Nuevo León had the effect of diminishing the amount available for the Texas farmers. No simple solution, satisfactory for every one, seems possible.

The Northern Sierra Madre Oriental and the Gulf Coastal Plain

The remaining section of the North is made up of the states of Tamaulipas, Nuevo León, and eastern Coahuila. This includes the Sierra

Madre Oriental and the Gulf Coastal Plain north of the latitude of Tampico.

The Sierra Madre Oriental is almost as great a barrier to communication as the Sierra Madre Occidental. Folded and faulted geologic structures have been eroded by torrential streams to form a bold mountain system through which routes of travel are not easy. South of Monterrey the Sierra is composed of a series of great north-south ranges, rising to elevations between six and twelve thousand feet above sea level, and separated by deep, generally flat-bottomed valleys and basins. Where these ranges are unbroken, passage over them is almost impossible; but in a few places there are breaches in the mountain ramparts. Inland from Tampico the three rivers which unite to form the Río Pánuco have cut headward into the highlands. In this section there is a confusion of very steep-sided valleys and ridges, but openings have been cut in the great ranges, and several passable routes are offered between the piedmont and the highlands. Early in the colonial period a road was built between San Luis Potosí and a port on the Río Pánuco, and now a railroad connects the mining centers of the highlands with Tampico. Farther north, communications between Linares on the piedmont and Galeana within the mountain region have been developed through a gap in the foremost range of the Sierra.

The most important of the pass routes, however, are in the north. Just at the city of Monterrey the main fold axes turn from a north-south alignment to an east-west alignment. From Monterrey northward for a short distance there are several easy passes through relatively broad valleys and basins which connect the highlands with the eastern piedmont. The ranges turn northward again in northern Coahuila before crossing the border into Texas. When Monterrey was founded in 1596, however, it was by no means certain whether the chief route of travel in the future would descend from Saltillo, or whether it would continue northward through Monclova to cross the Rio Grande at Eagle Pass. As a matter of fact the latter route was used more commonly than the route through Monterrey during the period of Spanish and Mexican control of Texas. The pre-eminence of the city of Monterrey was not assured until 1888 when the railroad from the Texas border at Laredo was built to this place, with the objective of using the pass to Saltillo as the route to the highlands and to Mexico City.

Meanwhile, a small population had become established in the Sierra Madre Oriental. Here, as elsewhere, the first land grants included hundreds of square miles. During the succeeding centuries these first

estates have been subdivided, but even today in the whole 4,000 square miles of the Sierra Madre south of Monterrey there are only 610 properties (216). The haciendas include a great variety of kinds of land: from the higher mountain slopes where the rainfall is fairly heavy the landowners can get lumber and charcoal; in some of the valleys where water is insufficient for irrigation cattle or goats can be pastured; but settlement is concentrated only on those few isolated spots where maize and wheat can be grown. Galeana, where wheat is collected to be sent to the piedmont in exchange for tropical products, has become the chief commercial town of the mountain region.

North of Monterrey the Sierra Madre Oriental is too dry to maintain any important communities of farming people. The small communities around Sabinas and Lampazos (Map 116) in northern Coahuila are supported by the mining of coal. In these districts Mexico is endowed with small but fairly good deposits of bituminous coal, a natural resource which is rare in Latin America. Coal is supplied to the Mexican railroads and to the heavy industries which have become established at Monterrey.

The area immediately surrounding the city of Monterrey is not densely populated. The only exception is the narrow zone along the mountain piedmont which extends southward to Linares. The somewhat more adequate rainfall which reaches this zone between the front of the Sierra Madre and an outlying mountain block (Maps 114 and 116) permits the use of this section for commercial agriculture. Sugar cane, oranges, cotton, maize, wheat, and beans are supplied mostly to the city market.

Monterrey

Monterrey itself has become much more than simply a pass city: today it is one of Mexico's leading industrial centers. In 1880 Monterrey had no more than 30,000 inhabitants; its first period of rapid growth came with the construction of the railroad, as previously noted. In recent years further rapid growth has been a result of the construction of the Pan American Highway from Laredo through Monterrey. By 1930 the city had passed 130,000 in population, and in 1937 it had an estimated population of 160,000 (214).

Today the city of Monterrey has become the hub of an extensive system of railroad lines (Map 116). The main line from the United States to Mexico City passes through Monterrey, tapping the coal fields near Lampazos on the way southward from Laredo, and ascending to the highlands at Saltillo; another railroad reaches the lower Rio Grande; still

another line runs southward to Tampico; and another crosses the desert country westward to Torreón. These railroads and their connections reach the most productive mineral and agricultural centers throughout the North of Mexico. In recent years the railroads have been supplemented to a greater and greater degree by paved automobile highways.

Related to this development of the lines of transportation is the industrial growth of Monterrey. In this city about three quarters of the iron and steel of Mexico is produced, in plants which employ between 2,500 and 3,000 workers. Iron ore is brought by rail from the Durango deposits and from smaller deposits in the northeast. The coal comes chiefly from Sabinas. The production, about 150,000 tons a year, is used mainly by the Mexican railroads. Monterrey is also Mexico's chief center of lead production; and it is a minor producer of silver, gold, copper, arsenic, bismuth, and antimony. Among the manufacturing plants of this city there are tile and glass factories, furniture factories, breweries, cigarette factories, and many others.

During the last decade another change has come to Monterrey and to the district south of it along the piedmont. The first link of the Pan American Highway has now been built from the border at Laredo southward to Monterrey. Instead of climbing to Saltillo, the highway continues southward along the piedmont through Linares to a place a little south of the latitude of Tampico—the little Indian community of Tamazunchale. Thence the road makes a spectacular climb to the highland, winding with a steady grade over the extremely rugged terrain cut by the Río Moctezuma and its tributaries. It passes not far from Pachuca on its way to Mexico City. Inland from Tampico this highway passes through country formerly inhabited only by scattered tribes of Indians who supported themselves from the wild game in the forests. Now streams of automobile tourists from the United States are going and coming over the new route to Mexico City. Southward along this highway are spreading such strange things as modern air-conditioned hotels, tourist camps of the latest design with all modern conveniences, gasoline stations with electric pumps, curio shops, and Indians attempting to thumb rides. Monterrey, now so easily accessible to the North American traveling public whose curiosity and mobility are incomprehensible to the average Mexican, is being invaded and by that process transformed—whether for better or for worse. The highway affords the first effective breach in the barrier of empty territory along the border; the southward penetration of North American culture traits is a social phenomenon worthy of careful study.

3. THE GULF COAST AND YUCATÁN

In striking contrast to all the other parts of Mexico is the Gulf Region, the region including the states of Veracruz, Tabasco, Campeche, Yucatán, and Quintana Roo. This territory makes up 12 per cent of the total area of the country and is occupied by 12 per cent of the population. Unlike most parts of Mexico, the Gulf Region is abundantly supplied with moisture—73 per cent of it receives sufficient rain in all months. Also unlike most parts of Mexico, a relatively large proportion of the region is classed as level—53 per cent of it fits into that category. From the point of view of the physical quality of the land this is the best maize-growing region of Mexico; here are to be found the largest per acre yields and the fewest crop failures. Many students of Mexican affairs believe that in this region there are the best undeveloped agricultural resources of the nation—soils, climates, and surfaces suited not only to commercial specialties, but also to the basic food grain of the people, maize. That only 12 per cent of the population occupies this region is interpreted by some writers as an inevitable reflection of the unpleasant, enervating climate of the tierra caliente and of the unhealthful living conditions; but there are other writers who insist that the neglect of this potentially rich land is due to a complex of historical causes, and that it can be remedied through a redistribution of people and the application of modern scientific techniques to the problems of tropical living.

Veracruz and Tabasco

Only south of the Río Tamesí can those tropical plants survive which are unable to endure occasional spells of freezing weather. The cold air masses from North America, which bring frosts to the coastal plain of Tamaulipas, continue southward even as far as the Yucatán Peninsula as cool waves accompanied by heavy rains. South of Tampico, however, frosts are very rare or entirely absent. Throughout the tierra caliente of the Gulf Coast the humidity is high at all times of the year, averaging not far from 80 per cent at the port of Veracruz. The rainfall is abundant.

The vegetation of the tierra caliente includes both forests and grasslands. It seems probable that the original vegetation of the coastal plain as well as of the lower mountain slopes was forest, but that extensive areas of savanna have been produced as a result of repeated burnings by the Indians. The great savanna south of the port of Veracruz (Map 119) is believed, on the basis of zoological evidence, to have once been covered with forest. Today, however, forests are found, on the plain,

only along the streams and along the coast. In Veracruz the lower mountain slopes are covered with a semideciduous forest; southeast of the Isthmus of Tehuantepec, in the state of Tabasco, this type of forest extends across the plain to the edge of the Gulf.

The first port that Cortés established along the Gulf Coast was at a site which proved to be a poor one both because of insect pests and because of the difficulty of defense. Cortés was only interested in making a landing and starting as quickly as possible for the conquest of the great Aztec state on the highlands. Later the necessity of developing one good port on the Caribbean through which connections with the homeland could be maintained led to the selection of another site where more suitable conditions could be found. In 1609 the old port was abandoned and the new city of Veracruz was established a little farther to the south. From Veracruz a colonial road was built into the highlands by way of Jalapa, a route now closely paralleled by the modern railroad. Veracruz, now a city of more than 70,000 people, remains the chief port of Mexico; it is equipped with breakwaters, modern docks, and other facilities for the handling of cargoes.

Except for the port city, most of the settlement of the state of Veracruz has progressed from the highlands of the interior down into the tierra caliente. The swampy coastal plain is still little used; but along the slopes of the mountains there is a string of plantations extending from a little south of Tampico to Orizaba (Maps 120 and 121). The chief concentration of people is in the zone where coffee can be grown—focusing on such towns as Jalapa, political center of the state, and Orizaba, an old center of cotton textile industries. Both Jalapa and Orizaba are between four and five thousand feet above sea level, in the tierra templada. Still lower, the plantations are fewer; yet there is an important production of such tropical crops as rice, sugar cane, tobacco, bananas, vanilla, rubber (Castilla), and chicle (the chief ingredient in chewing gum). From the rain forest, collectors—who go out from the plantations at certain times of the year—bring back valuable cabinet woods, gums, and a variety of other products of small bulk but of high value.

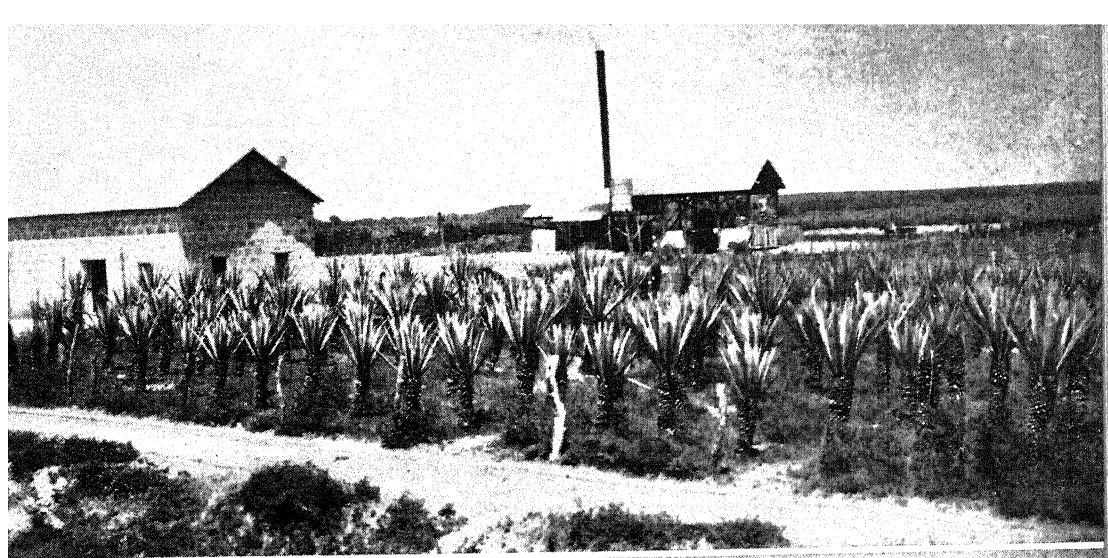
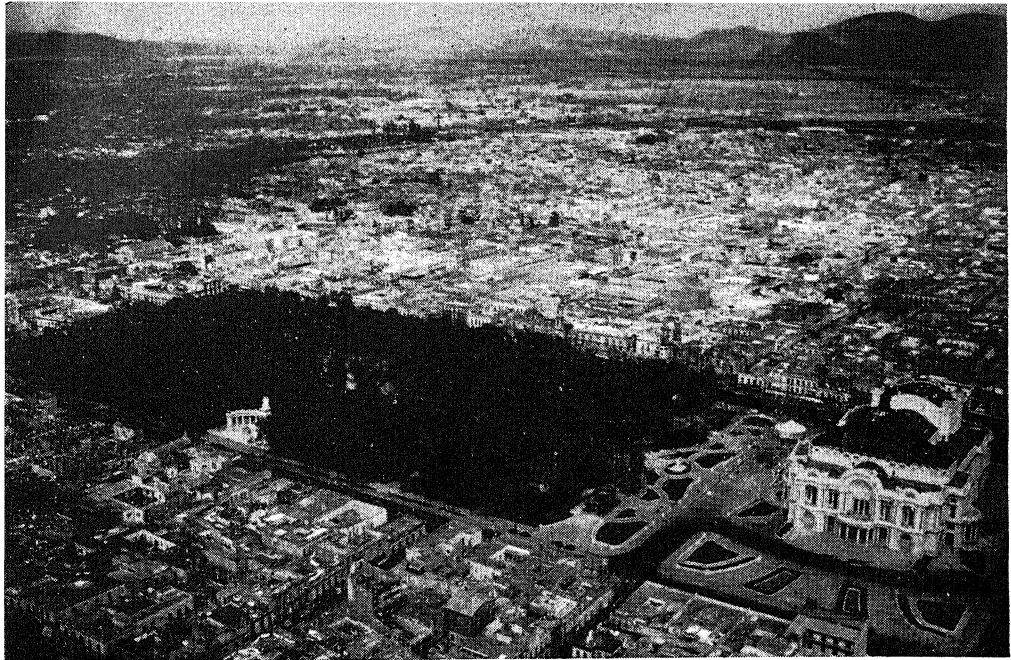
The number of plantations and of settlers decreases as one proceeds southward in Veracruz, and the southern part of the state, on the northern side of the Isthmus of Tehuantepec, is very sparsely inhabited. The Isthmus of Tehuantepec has never been of sufficient importance as a route of travel to support large cities at either side. Although only about 130 miles separate the Pacific Ocean from the Gulf of Mexico and the

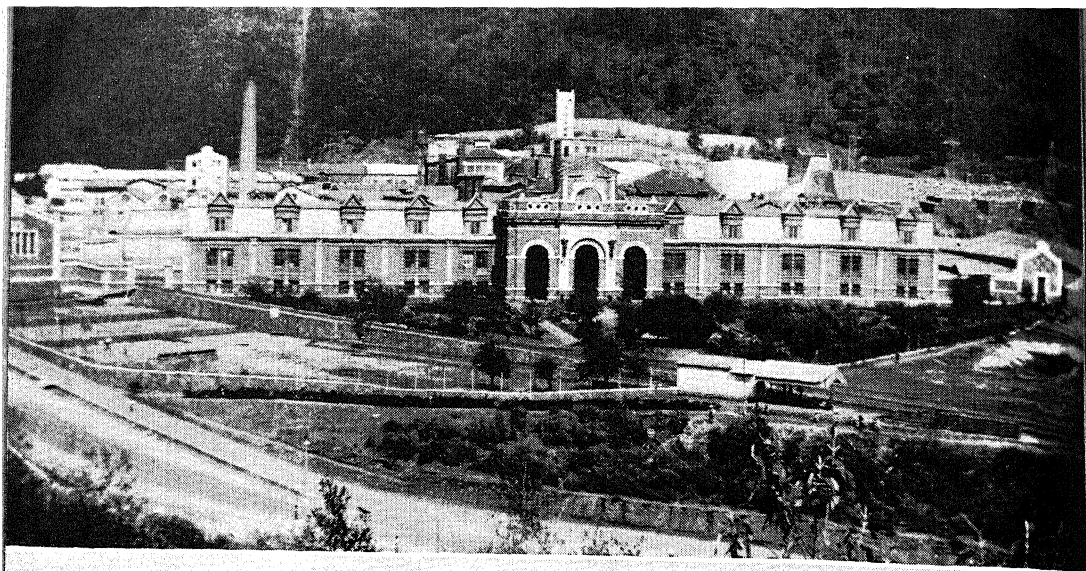
climb is no more than about 800 feet, the remoteness of the Isthmus from the centers of Mexican population and the existence of easier routes elsewhere help to explain the relatively small use of this pass. In 1907 a railroad was built from Puerto México on the Gulf side to Salina Cruz on the Pacific side. The economic importance of this line is, however, very slight.

Yucatán

The Peninsula of Yucatán, once the well-populated center of the Maya culture, remained for a long time a remote and relatively unimportant part of the Spanish colonial holdings in America. It had little to attract the conquerors: the Maya cities, already despoiled of their wealth, were mostly lost in the fast-growing forest; the native inhabitants, practicing a shifting agriculture, afforded no large concentrations of workers ready to be exploited by the newcomers; no mines of gold or silver were to be found. The low sandy shore with its offshore bar on which landings from the ocean could be made only with great difficulty provided no good natural harbors. Nevertheless, Yucatán was not entirely neglected. Mérida was founded in 1542, and the few Indians were allotted to the Spanish conquerors in encomiendas. The land was soon partitioned in large estates on which the grazing of cattle was the chief economic activity, and hides, tallow, and salt beef the chief commercial products.

There are a number of handicaps to the successful utilization of the Yucatán region. In the northwest, around Mérida, the rainfall is low; the amount of moisture increases toward the south and east until it is abundant on the borders of British Honduras and Guatemala. A scrub forest with patches of savanna occupies the drier northwest parts of the peninsula, but as the rainfall increases toward the southeast the scrub forest is soon replaced by a growth of tall trees (Map 119). A scanty population armed only with primitive tools finds life easier in the dry areas than where the exuberant tropical vegetation springs up rapidly to choke every clearing.

Furthermore, surface water is not easy to find in Yucatán. The peninsula is underlain by horizontal beds of limestone in which the rain water forms underground solution caverns. There are no surface streams; and only where the cavern roofs have collapsed are there pitlike cenotes in the bottoms of which the plentiful ground water can be reached. The native Indians, having no iron tools, were unable to dig wells and had to locate their permanent settlements close to the natural sources of surface water.

The upper photograph was taken on a henequen plantation in Yucatán. The drier northwestern corner of the peninsula, near Mérida, is well adapted to this plant, which is grown in scattered plots over the nearly level limestone plain. (Photo by Robert S. Platt.) The lower photograph illustrates the process of preparing the henequen for market. The leaves of the plant are softened and crushed to remove the strong, coarse fiber, which is then dried in the sun. Henequen fiber is made into coarse twine, especially for use in wheat-binder machines. (Courtesy of Eastern Air Lines.)

Above is a view of Mexico City and the Basin of Mexico — which the Indians called Anáhuac. Central in the picture, and in the city itself, is the Alameda. At the east end of this park is the National Theater, or Palacio de Bellas Artes, a structure of white marble which both externally and in its interior fittings rivals the finest in the world. (Courtesy of the Mexican Railway Company.) The cathedral below — which stands on the northern side of the Plaza de la Constitución (better known as the Zócalo) — is a beautiful specimen of Spanish

Above is a market scene in Mexico City. "Going to market" is here, as elsewhere in Latin America, a social event. The opportunity a market affords for social intercourse is probably as important to these people as the business transacted. (Photo by Hugo Brehme.) Below is a picture of a big steel plant at Monterrey, the city which has become the center of Mexico's heavy industries. Large-scale manufacturing had already transformed this place from a sleepy provincial town to a busy industrial city before the Pan American Highway made

Mexican industries are varied. The upper picture shows a large paper manufacturing plant in Tlalmanalco, near Mexico City. The capital itself is one of the larger industrial cities of Latin America, and in its vicinity are numerous manufacturing enterprises like the one pictured above. (Courtesy of the Mexican Government Travel Bureau.) The lower picture shows a silver mine in the mountains of Mexico. Stream dissection, which produced the extremely rugged surface of mountains and narrow valleys on the margins of the Mexican Highland, also laid open the rich veins of silver for which the country has long been

Nor were the native people of Yucatán so easy to exploit as those of the high basins of the Central Region. Even as late as 1847 the Indians of Yucatán carried out a major revolt against the white man's rule, which had to be put down with force.

During the long course of human history in this region three different forms of land use have been successfully established. The first of these was the shifting agriculture of the Maya period. For many centuries the population was large enough to overcome the forest and maintain a part of the cleared land under crops, although eventually, as we have seen, this form of use may have led to the collapse of the Maya civilization through the impoverishment of the over-worked soil. The second form of use was the grazing of herds of domestic animals on the natural pastures of the savanna and scrub forest. This period was introduced when the Spaniards brought cattle to the region; it resulted in the establishment of a few permanent settlements, such as Mérida, but in no great prosperity. The third form of use was the planting of henequen which began around Mérida in the first years of the present century.

Henequen has become important and has brought a substantial income to the landowners in Yucatán because of developments taking place elsewhere in the world. The plant is a species of yucca which yields a coarse fiber useful in the spinning of strong twine or rope. Early in the 20th century the Spanish-American War and the trouble in the Philippines had shut off the world's supply of Manila hemp just at the time when the increased use of mechanical cutters and binders in the wheat lands of the world, especially in North America, Argentina, and Australia, was resulting in a rapidly growing demand for inexpensive supplies of strong twine. Agricultural experts found that the climatic and soil conditions of northern Yucatán were ideal for the planting of henequen, and with the aid of foreign capital some of the large landowners of the region devoted a part of their lands to the new commercial crop. Yucatán today produces more than half of the henequen used in the United States, and has become the world's largest producer of cheap twine. In the areas used for henequen plantations the density of population has increased greatly over the average densities of the districts devoted to cattle grazing. In the rural sections around Mérida there are densities of more than 125 people per square mile.

In the Mérida District, as in the Laguna District, the Mexican government has started to apply its plans for the development of co-operative agricultural communities. The henequen plantations have been expropriated and subdivided into co-operative ejidos. Since 1933 there has

CENTRAL AND SOUTHERN MEXICO, GUATEMALA, BRITISH HONDURAS, EL SALVADOR, HONDURAS
SURFACE CONFIGURATION
0 100 200 300
MILES
LOWLANDS
INTERMONT BASINS
BOLSONS
DESERT RANGES
MOUNTAINS
HIGH MOUNTAINS
MEXICO
Z. ZUMPANGO
M.C. MEXICO CITY
S.L.P. SAN LUIS POTOSÍ
P. PACHUCA
T. TAMAZUNCHALE
C.C. CAPE CORRIENTES
GUATEMALA
G.C. GUATEMALA CITY
P.B. PUERTO BARRIOS
M.T. MT. TAJAMULCO
EL SALVADOR
S.S. SAN SALVADOR
HONDURAS
C. COMAYAGUA
L.E. LA ESPERANZA
S.B. SANTA BÁRBARA
F. GULF OF FONSECA
ZACATECAS
AGUASCALIENTES
TEPIC
GUADALAJARA
GUANAJUATO
QUERETARO
S.L.P.
TAMPICO
TUXPAN
MORELIA
TOLUCA
TAXCO
PUEBLA
ORIZABA
JALAPA
VERACRUZ
MANZANILLO
ACAPULCO
PACIFIC
OCEAN
OAXACA
PUERTO MÉXICO
ISTHMUS OF
TEHUANTEPEC
SALINA CRUZ
MÉRIDA
YUCATÁN PENINSULA
MÉXICO
BRITISH HONDURAS
BELIZE
GUATEMALA
GULF OF HONDURAS
RÍO MOTAGUA
R. ULÚA
COBÁN
HUEHUETENANGO
QUEZALTENANGO
OCÓS
CHAMPERICO
ANTIGUA
COPÁN
SAN JOSE
ACAJUTLA
EL SALVADOR
TEGUCIGALPA
LA UNIÓN
HONDURAS
R. LEMPA
RÍO BALSAS
PÁNUCO
22°
18°
14°
104°
100°
96°
92°
88°

Map 118

CENTRAL AND SOUTHERN MEXICO, GUATEMALA, BRITISH HONDURAS, EL SALVADOR, HONDURAS
NATURAL VEGETATION
0
100
200
300
MILES
PACIFIC
OCEAN
XEROPHYTIC SHRUB AND DESERT GRASS
SCRUB FOREST
TROPICAL FOREST
CONIFEROUS FOREST
SAVANNA
SHORT GRASS STEPPE
104°
100°
96°
92°
88°
22°
18°
14°

MAP 119

CENTRAL AND SOUTHERN MEXICO, GUATEMALA, BRITISH HONDURAS, EL SALVADOR, HONDURAS
LAND USE
0 100 200 300
MILES
PACHUCA
SUGAR CANE
IRRIGATED SUGAR CANE
FRUIT
BANANAS
COFFEE
CACAO
HENEQUEN
MAIZE, WHEAT, BEANS, CHILE, ALFALFA, AND MAGUEY
GRAZING WITHOUT FORAGE CROPS
FOREST PRODUCTS
IRRIGATED SUBSISTENCE CROPS
UNIRRIGATED SUBSISTENCE CROPS
OIL
SILVER AND GOLD MINES
104°
100°
96°
92°
88°
22°
18°
14°

MAP 120

CENTRAL AND SOUTHERN MEXICO, GUATEMALA, BRITISH HONDURAS, EL SALVADOR, HONDURAS
POPULATION
0 100 200 300
MILES
URBAN
MORE THAN 100,000
LESS THAN 100,000
RURAL
EACH DOT 1,000
A. AGUASCALIENTES
D. DURANGO
G. GUANAJUATO
H. HIDALGO
MEX. MEXICO
M. MORELOS
P. PUEBLA
Q. QUERÉTARO
S. SINALOA
Z. ZACATECAS
TAMAULIPAS
VERACRUZ
SAN LUIS POTOSI
NAYARIT
JALISCO
COLIMA
MICHOACÁN
GUERRERO
OAXACA
TABASCO
CHIAPAS
CAMPECHE
YUCATÁN
QUINTANA ROO
BRITISH HONDURAS
HONDURAS
GUATEMALA
EL SALVADOR

Map 121

been a decline in the area planted to this crop, although it is thought that this decline will be only temporary. For the first time the profits of the enterprise are finding their way to a relatively large proportion of the people.

The Oil Fields

The Gulf Region as a whole has another resource of even greater significance to the foreign economic and political relations of Mexico —this is oil. We must return again to the northern part of the region, for the center of the oil industry is Tampico.

The first successful oil well in Mexico was drilled about fifty miles west of Tampico in 1901. The importance of the new fields was quickly appreciated by North American and British interests, and, with the aid of foreign capital, Mexico's production was rapidly increased. There were two chief fields: one was inland from Tampico, shipping through that port; and the other was inland from Tuxpan, a short distance south of Tampico. In 1904 Mexico shipped out 221,000 barrels; by 1910 the exports had been increased to more than 3,000,000. Just before the beginning of the First World War exports rose to 25,000,000 barrels, and then after a slight decline continued to increase rapidly until in 1921, the peak year, Mexico exported more than 193,000,000 barrels, 21 per cent of the world production of that year. Since 1921, however, production and export have been steadily declining. In 1929 the export was a little less than 45,000,000 barrels (compared with the 1929 production of nearly 297,000,000 barrels in the state of Texas). By 1931 Mexico was producing only 2.4 per cent of the world's supply of oil. In 1938 Mexico's share of Latin-American oil production was 5 per cent.

The reason for the decline in oil production lay partly in the declining yields of the oil wells already in existence and partly in the unwillingness of the foreign companies to carry on exploratory work in undeveloped areas. Since foreign capital controlled all but 5 per cent of the industry, the failure to bring new wells into production resulted in the gradual decline of total production.

There are many widely separated areas along the Gulf Coast in which exploratory wells have already proved the existence of good reserves. In addition to the tested areas there are many other places where surface structure suggests the presence of oil underground. But the arrangement of these potential oil fields in widely scattered small units will make their development very costly. Apparently Mexico still has a large reserve, with the possibility that new bonanza fields may be discovered.

In 1938 the properties of the foreign oil companies were expropriated by the Mexican government. For many years the companies had watched uneasily the program of social reform and had explained their failure to carry on the development of new fields by the fear that their investments might become worthless. Labor troubles had become more and more frequent. Although the companies agreed, in 1938, to increase the wages of the oil workers as demanded by the government, they would not agree to accept participation by labor in the management, and this refusal led the Mexican government finally to cancel the foreign concessions.

The results have not been those which were expected by the Mexicans. To be sure the decline in oil production in 1938 was followed in 1939 by a slight increase, and there was reasonable hope that, under government management, the increase might be continued in 1940. An important source of revenue for the government might have been provided had events worked out this way. Unfortunately, however, the outbreak of the Second World War closed the European markets in which Mexico had sold most of its oil; the government had to shut down many wells, and found itself unable to maintain the wage scale it had adopted; worker participation in management proved to be a distinct failure. The problems of reorganizing the oil industry on a national basis, and of finding the necessary capital to undertake the exploratory work which alone would make it possible to tap the reserves, have yet to be solved.

It is important to keep in mind that even during the period of spectacular development, the number of people actually engaged in the oil business was relatively small. In 1929 only 2 per cent of all the gainfully employed Mexicans were working in all the mining industries together, including oil. The problem of the oil industries is a very important one, not only for the revenue which might be brought to the Mexican treasury, but also for the future of Mexico's foreign relations. But in terms of the distribution of people and of the economy which supports specific areas of settlement, the oil industry is a relatively minor factor.

4. THE SOUTH PACIFIC REGION

The last of the four outlying regions to be studied is the South Pacific Region. This includes the states of Colima, Guerrero, Oaxaca, and Chiapas. Its area is about the same as that of the Gulf Region—approximately 12 per cent of the total area of Mexico. But it is inhabited by a somewhat larger population than the Gulf area, having 14 per cent of the Mexican people. In contrast to the Gulf Region, less than 20 per cent

of its area can be classed as level, for although there are no very high peaks comparable to the cones of the volcanic area, there are few parts of Mexico where the surface is more rugged.

The Southern Dissected Border of the Highlands

There are two distinct parts to the South Pacific Region, and these parts are separated by the Isthmus of Tehuantepec. The northern part, which we have called the southern dissected border of the highlands, is the first of these parts. In many respects this southern dissected border of the highlands is transitional between the surface features and geologic structures characteristic of North America and those characteristic of Central America. Many geologists insist that western North America, with its typical north-south mountain axes, ends with the volcanic area of the Central Region of Mexico, and that the dominant northwest-southeast structures which appear about the latitude of Cape Corrientes belong with Central America (198). Yet, in terms of surface features, the country between Cape Corrientes and the Isthmus of Tehuantepec is closely related to the highland farther north. The same general upland level between six and eight thousand feet above the sea which is found in the basins of the central highland north of Mexico City is preserved also in the ridge crests of the southern dissected border. The rugged surface of the latter region is the result of stream dissection — of the formation of deep valleys cut below the general highland level. In spite of the trend of the underlying geologic structures, therefore, geographers generally place the southern limit of North America at the Isthmus of Tehuantepec.

Most of the southern dissected border of the highlands is drained by the Río Balsas and its tributaries. The main stream has opened a deep gulf well into the tierra caliente along the northern border of Guerrero, and the tributaries extend in dendritic fashion back into the higher country on either side. Along the eastern headwaters of the Balsas, a ridge of only slightly dissected highland connects the central part of Oaxaca with the volcanic massif of Popocatepetl and Ixtacihuatl. In the course of stream erosion, however, certain more resistant structures in the Balsas Valley were exhumed and left standing as prominent and more or less isolated blocks. An example is the small block mountain in northern Guerrero not far north of the Balsas itself, in which the old mining town and present tourist center of Taxco is situated; another example is the larger block bordering the Pacific in southern Michoacán, Guerrero, and southern Oaxaca, which is known as the *Sierra Madre del Sur*.

Flat places are remarkably few and widely scattered in this region. There are some which are situated on undissected remnants of the highland surface; there are a few narrow valley flats which develop along rivers just upstream from a gorge; and there are a few located where the valleys broaden out in small structural basins. On these flat places the people are concentrated; but because the haciendas generally utilized the valley and basin lands for commercial crops, most of the subsistence food crops of the region are grown on the precipitous valley sides. Here, as in other parts of Mexico, crops are grown on amazingly steep slopes, where it is said with considerable truth that a farmer could easily fall out of his farm.

The altitude of this region determines the general nature of the vegetation cover and of the crops. No part of the South Pacific Region is deficient in moisture, although most of the rain comes in summer, and the winters are dry. The vertical zones and the products corresponding to them are similar to those described for Mt. Orizaba. The tierra caliente is restricted to the deeper part of the Balsas Valley and to the coastal strip along the Pacific—the latter, however, being little used because of its isolation. There are a few areas high enough to get well into the tierra fría. But most of the land in this region lies within the tierra templada.

The coast north of the Isthmus of Tehuantepec is extremely forbidding. The Sierra Madre del Sur descends with very steep slopes almost to the water's edge, leaving only a narrow fringe of sandy and generally hot and dry lowland. The ports all suffer from one handicap or another: either the water is too shallow if they are situated, like Salina Cruz and Manzanillo, near the outlet of one of the silt-laden rivers; or they are isolated from the interior by steep mountain slopes, as is the case at Acapulco. The latter place, because of its excellent harbor, was selected by the Spaniards as the chief port of departure for the Philippines. But the country behind Acapulco is so difficult to cross that no railroad has ever been built to connect it with the interior, and only in 1940 was the new paved highway extended to it from Taxco. Acapulco has become, in spite of its isolation, a seaside resort of considerable popularity. The completion of the road will open it to an increasing flood of North American tourists—a stream which has already converted Taxco, old sixteenth-century silver and tin mining center, into a still more profitable tourist center. Since a railroad connects Manzanillo, in Colima, with the interior in Jalisco, this port has become Mexico's chief inlet and outlet on the Pacific.

Chiapas

The highland of Chiapas is the second of the two divisions of the South Pacific Region. This highland is characteristically Central American: it is composed of folded and faulted structures, partly covered with volcanic outpourings. The main structural features run parallel to the Pacific Coast. Behind a narrow coastal lowland the first range of mountains, the Sierra Madre de Chiapas, rises to elevations of more than 9,000 feet within twenty miles of the ocean. Immediately northeast of this range is the rift depression known as the Valley of Chiapas. The floor of this depression is between 1,500 and 3,000 feet above sea level. It is drained by a tributary of the Río Grijalva which finds its outlet to the Gulf in the state of Tabasco. Northeast of this, again, is a succession of block mountains, each more or less level-topped but deeply dissected by streams. From altitudes of over 12,000 feet overlooking the Valley of Chiapas, these mountains drop down toward the level limestone plains of Yucatán. Most of the people in this part of Mexico live in the Valley of Chiapas, or along the lower slopes of the Sierra Madre de Chiapas near the Pacific Coast.

Here also the natural vegetation and the prevailing forms of land use are arranged by vertical zones. The tierra caliente of Chiapas is of greater potential value for rainy tropical crops than is the similar zone northwest of the Isthmus of Tehuantepec because of the increasing rainfall toward the southeast. On the lower slopes of the mountains in this district the Aztecs used to grow their supplies of cacao, from which they made a ceremonial drink we know as chocolate. This is perhaps the native home of the cacao tree. Cacao is still produced here, although more important today are the coffee plantations higher up the slopes. The whole Pacific area is now made accessible by a railroad connecting with the line across the Isthmus and also with the Guatemalan railroads.

The Valley of Chiapas is today well populated by a farming people whose chief crop is maize. The density is between 25 and 60 per square mile. On the natural savannas of the valley, cattle are pastured; from the higher parts of the valley come small quantities of wheat; from the slopes on either side comes coffee; and above the tree line on the mountains to the northeast there is a second zone devoted to the grazing of cattle. Most of the people of this area, like the majority of those elsewhere in Mexico, raise crops or pasture animals chiefly for local subsistence; the exports of cattle and coffee are small.

Such are the outlying parts of the Mexican state. The clusters of population in these areas are highly diverse in their origin and in their present

relations to the land. Yet through all the diversity run certain prevailing themes: the fundamental poverty of the rural workers; the overwhelming importance of subsistence farming in terms of numbers of people, and as a corollary, the relatively small numbers who are involved in economic activities of commercial significance. Since each community must produce what it needs for its existence, there is a certain basic sameness to rural life throughout the whole country. In spite of regional differences of dress, custom, and even language, and local specialization in handicrafts, all Mexican rural communities are organized and function as social and economic units in accordance with a fairly uniform pattern (241). Moreover, Mexico is truly a one-crop country, for its one basic food crop, maize, has an acreage greater than that of all other crops combined. From the dry north to the rainy south, from the tierra caliente to the high intermont basins, on the patches of level land, but more often on the extraordinarily steep valley sides—everywhere is the same little farm or *milpa* on which the Mexican Indian farmer raises the one crop he knows, to provide himself with the one kind of grain he is accustomed to eat.

5 THE CENTRAL REGION

The group of states which are combined to form the Central Region make up 14 per cent of the area of Mexico, and in these states live 48.6 per cent of the Mexican people (Maps 122 and 123). Actually, if geographic regions rather than arbitrary political divisions were considered, the area would be somewhat reduced, for most of southern Jalisco and Michoacán really belong in the South Pacific Region; yet this reduction would have little effect on the proportion of the people inhabiting the central area. In this core of the Mexican state are 15 per cent of all the agricultural land, 45 per cent of all the farmers of the country, and more than 50 per cent of all the area devoted to maize. And here is the focus, also, of Mexico's twin problems—the agrarian problem and the industrial problem.

The Central Region is itself a diverse land, and one which includes many areas which are only thinly populated as well as other areas which were well populated even in the period before the arrival of the Spaniards. The land is composed of a number of well-defined basins, all drained by rivers which reach the sea, except the Basin of Mexico in which the capital city is located. Between the basins much of the land is composed of gently rounded hills through which the rivers have cut deep, narrow valleys; and the whole scene is given extraordinary beauty by the series

CENTRAL MEXICO
SURFACE CONFIGURATION
LOWLANDS
INTERMONT BASINS
BOLSONS
DESERT RANGES
NS
MOUNTAINS
HIGH MOUNTAINS
CHIEF VOLCANIC PEAKS
22°
20°
18°
104°
102°
100°
98°
0
100
MILES
RIO SANTIAGO
TEPIC
MT. CEBORUCO
CAPE CORRIENTES
AGUASCALIENTES
SAN LUIS POTOSI
R. TAMESI
TAMPICO
RIO PANUCO
TAMAZUNCHALE
RIO MOCTEZUMA
LEON
GUANAJUATO
IRAPUATO
CELAYA
QUERETARO
GUADALAJARA
RIO LERMA
MORELIA
COLIMA
MANZANILLO
PACHUCA
APAM
IZUMPANGO
MEXICO CITY
TOLUCA
TLAXCALA
MT. IXTACIHUATL
AMECAMECA
MT. POPOCATEPETL
CUERNAVACA
CUAUTLA
PUEBLA
TAXCO
RIO BALSAS
RIO ATOYAC
JALAPA
COFRE DE PEROTE
MT. MALINTZIN
VERACRUZ
MT. ORIZABA
ORIZABA

MAP 122

CENTRAL MEXICO
POPULATION
URBAN
MORE THAN 1,000,000
MORE THAN 100,000
LESS THAN 100,000
RURAL
EACH DOT 1,000
A. AGUASCALIENTES
D.F. FEDERAL DISTRICT
H. HIDALGO
Q. QUERÉTARO
T. TLAXCALA
0
100
MILES
NAYARIT
ZACATECAS
A.
SAN LUIS POTOSÍ
TAMAULIPAS
GUANAJUATO
Q.
H.
VERACRUZ
JALISCO
COLIMA
MICHOACÁN
MÉXICO
D.F.
MORELOS
T.
PUEBLA
GUERRERO
22°
20°
18°
104°
102°
100°
98°
96°

Map 123

of superb volcanic cones, and by the many lesser volcanic forms scattered throughout the region from Ceboruco in the state of Nayarit on the border of the Basin of Jalisco, to Orizaba which overlooks the Basin of Puebla. As we have pointed out in a previous chapter, the Indian groups migrating from the drier north came upon this somewhat wetter country with its many lakes and its running streams fed by permanent snow fields, and saw in it a land of plenty. Anáhuac for the Nahua peoples was like Babylon for the Assyrians. In about 1325 the Aztecs founded their capital city of Tenochtitlán on an island in Lake Texcoco where it could be easily defended, and from this center they extended their conquest, or at least levied tribute, over much of the territory to the south. Each of the basins of the central area, however, had its own distinct Indian culture which differed in language and customs from the cultures of other basins. The native peoples, even those who were brought under Aztec rule, were never molded into one coherent culture as were the subjects of the Inca in Peru; land and people remained extraordinarily diverse.

The First Spanish Settlements

The story of the conquest of Mexico by Cortés and his little band of men is one of the great epics of adventure in the New World. In 1519 Cortés arrived on the margins of the Basin of Mexico with about 350 Spaniards and more than a thousand Indian allies. But after occupying the palace of the Aztec ruler for several months, the Spaniards were forced to a disastrous retreat on the famous *noche triste*—June 30, 1520. Cortés returned the next year and destroyed Tenochtitlán: 1521 marks the date when the Spanish conquerors took over from the Aztecs the political and economic rule of the dense Indian populations of the central area. There can be no doubt regarding the objectives of this first conquest, and none regarding the reasons which led Cortés to found the city of Mexico on the site of old Tenochtitlán. Ease of living, coolness of climate, productivity of soil for plantation crops—these were definitely not the reasons for the settlement of the Spaniards in the central area. The objective was wealth—first wealth which had already been accumulated and could be carried away; then more wealth in the form of minerals ready to be mined. To furnish the necessary labor in the mines and to provide the newcomers with an adequate supply of food a large population of peaceful Indian farmers was needed; and dense Indian population also satisfied the other great purpose of Spanish conquest—the conversion of infidels to the Christian faith. Sedentary Indians and stores or

mines of precious metals—these were factors which guided the course of Spanish settlement; and both were abundant in the central area.

The fifty years after the founding of Mexico City in 1521 witnessed the establishment of mining communities and the start of active mining operations at almost all the sources of precious metals in Mexico. Few new sources have been discovered since. Northeast of the capital was the silver town of Pachuca, still the richest in the world; north of the capital was the silver mine of Zumpango; northwest of Mexico City was the gold and silver center of El Oro; in the hilly country south of the Basin of Guanajuato was the silver center of Morelia, and in the mountainous country north of the Basin was another silver-mining community, Guanajuato; to the west was Guadalajara, itself a center of spreading settlement, and locally enriched by silver mines and dense Indian populations; farther to the north was Aguascalientes, and also the three prominent silver-mining towns previously described—San Luis Potosí, Zacatecas, and Durango; south of the capital was the silver mine of Taxco. The restless search for silver, gold, and dense populations of peaceful Indians led the Spaniards to the far reaches of their vast territory, far beyond the present limits of Mexico; and wherever Indians or precious metals were discovered, towns were founded, and Spanish civilization was established. Where Indians and precious metals were lacking, the Spaniards either turned the area over to the missions, or they utilized it for vast cattle ranges. Meanwhile, in the Central Region the Indians who escaped work in the mines and who survived the epidemics of imported diseases were able to continue to live as they had lived before the conquest—by raising basic food crops for their own use, and a little surplus to pay as tribute to the lords of the land.

Pattern of Population in the Modern Period

The rural population of the Central Region is still predominantly Indian, and the many forms of life adopted from the Spaniards need not obscure the fact that the great majority of these people still live in the traditional Indian manner. It is important to understand, therefore, that the concentration of the Indian grain, maize, in the Central Region is a very different kind of agricultural localization from that which appears in the Argentine Maize District or in the Corn Belt of the United States. It is a fundamental fact, basic to an understanding of Mexico's problems, that this concentration of maize in the Central Region is no more than a reflection of the concentration, in that area, of the Mexican people.

BASINS	STATES
4. Basin of Guanajuato	Southern Guanajuato, including bordering parts of the highlands of Guanajuato, Querétaro, and Michoacán
5. Basin of Jalisco	Part of the state of Jalisco
6. Valley of Aguascalientes	Aguascalientes, extending into near-by parts of Jalisco and Zacatecas
7. Valley of Morelos	State of Morelos, and bordering edge of Guerrero

The Basin of México

The original Anáhuac of the Aztecs was the Basin of México, an irregular-shaped depression some thirty miles east and west by fifty miles north and south. When the Aztecs knew this basin, its bottom was occupied by five separate lakes, each shallow and bordered by marshy zones. Tenochtitlán was built on an island in the midst of Lake Texcoco and was connected to the land by causeways. The Indian communities which the Spaniards in the course of time incorporated in their haciendas, were strung along the margins of the basin and the lower and gentler slopes of the bordering hills and mountains. The irregular shape of the basin produced, therefore, a very irregular pattern of population.

The Basin of México is the only one of the seven areas of dense population which is not drained naturally to the sea. In 1607–8, however, the engineer Enrico Martinez partly drained the basin by digging a ditch and tunnel northward across a low divide to the headwaters of the Pánuco system. In the present century, further drainage operations have completed the removal of Lake Texcoco—but with results which are not altogether fortunate, for the lake-bed soils were found to contain such a high percentage of salts that not even pasture grasses would grow on them without expensive chemical treatment. Instead, therefore, of acquiring a huge area of exceptionally rich farmland, as was anticipated, the city of Mexico found itself bordered by a vast expanse of empty flats, only the edges of which can be utilized. During the dry winters the bare ground gives off great clouds of dust which contributes to the unpleasant and even unhealthful conditions of the capital. The fact that the city is built on a part of the old lake bed has also added to its difficulties, for the ground has proved incapable of supporting the great weight of some of its larger buildings: the Palacio de Belles Artes, for instance, started in 1900 and completed in 1935, has already settled more than five feet.

The population of the Basin of México, outside of the capital city, is still distributed much as in preconquest days, in a series of small separate communities along the margins of the former lake bed (230). On the outskirts of the capital, the settled area has, it is true, crept well up the bordering mountain slopes, but generally only the lower slopes are occupied by villages The cluster of people included in this area extends well beyond the immediate basin, however, both in the southeast and in the northeast. Along the western base of the great volcanoes Ixtacihuatl and Popocatepetl there are several small valleys filled with agricultural communities, the largest of which is Amecameca. Toward the northeast, along the line of the Pan American Highway, there are stretches of gently rolling upland, utilized in scattered patches for crops. Sixty-three miles by road from the capital is the old colonial mining town of Pachuca, a closely crowded group of low buildings along narrow, irregular streets wedged against the valley head where the world's richest silver mines are located.

The crops raised in the farming communities of the Basin of México are similar to those produced in the other parts of the Central Region. Maize is by far the most important in terms of acreage. On the lower hill slopes surrounding the villages are the fields of maize, commonly cultivated with oxen and wooden plows, with a technique which has shown little change since plows were first introduced by the Spaniards. The yields per acre are notoriously small. Sometimes in the same field with maize are beans, and near by small plots may be devoted to the production of chile and alfalfa. On some of the haciendas there are extensive areas devoted to the cultivation of wheat, and lesser areas to barley. But the maize crop is the basis of the popular diet, a diet composed principally of maize, beans, and chile, and therefore seriously deficient in fats and sugars which build energy.

The Maguey Plantations. All through the Central Region considerable acreages of hacienda lands are devoted to the cultivation of *maguey*. This is a species of agave from which a sweet liquid is derived to be made into the national popular alcoholic drink *pulque*. The whole business of raising maguey, making pulque, and supplying the market, particularly the larger city markets, requires special organization (211). Maguey is seldom grown except on the lands of a hacienda. It grows on poor, thin soils where other crops cannot gain a footing. But since the maguey plant requires some eight years to mature, only the large landowners can make the necessary long-time investment. In the eighth year the maguey

plant would normally send up a tall stalk from its bunch of thick stiff leaves; but as this stalk forms it is carefully cut away, and a small cavity is left in the heart of the plant. For several months thereafter a clear liquid known as *agua miel* (literally "honey water") oozes into this cavity, at the rate of several liters per day. Gradually the leaves wither and the plant dies. Meanwhile the gatherer of agua miel goes from plant to plant collecting the juice in a skin bag and transporting it to the hacienda headquarters or to a near-by village.

Making the pulque is decidedly a "home industry," although it requires the specialized services of an expert. The agua miel is placed in large rawhide vats and put through a process of fermentation. Each day some of the product is drained off and sent to the market. The pulque, a milky liquid, quickly spoils and must be consumed within twenty-four hours. The pulque factories, therefore, are small and scattered—at least one in every community—and the product is not transported far to its market. In every village and at many places in the cities are the pulquerías, where the product is sold by the glass.[5] The chief center of maguey production for the supply of Mexico City is in the small Basin of Apam, northeast of the capital, but the crop occupies many small patches throughout the Central Region.

Undeveloped Possibilities. The Basin of México could provide good conditions for the production of wheat, and excellent conditions for the grazing of cattle. The acreages of wheat are being gradually increased as the government program of rural education proceeds; but the opportunities for the development of an intensive pastoral economy for the supply of beef and dairy products to the large populations of the central area have been neglected. The physical conditions would favor such a form of land use: the grasses are nourishing and remain green and edible throughout the year; the temperatures are low enough to reduce insect pests to a minimum, and dairy products could be handled without the usual difficulties encountered in tropical countries. But the demand for fresh meat, milk, and cheese is not great. By long tradition the Mexican people are not meat-eaters and do not care for dairy products. If the popular taste for these foods could be increased an important attack on the dietary problem of the Mexicans would have been made; and,

[5] Pulque-drinking probably originated with the Huastecs. The stern Aztecs permitted its use only on ceremonial occasions. Today it forms, along with maize, beans, and chile, the basis of the Mexican peasant's daily diet. In spite of reformers who see it only as an expensive evil, pulque seems to have definitely beneficial effects if not taken in excessive quantities (241).

since these items could probably be supplied inexpensively from the local region, the Basin of México would, by that process, be transformed from a land of low productivity to a land of high productivity. But popular tastes are not easily changed.

The Basin of Puebla

The second of the clusters of people of the Central Region is in the Basin of Puebla. This lies on the eastern side of the volcanoes Ixtacihuatl and Popocatepetl, at an elevation of a little over 7,000 feet. The city of Puebla is 78 miles by road southeast of Mexico City, and about 200 miles west of Veracruz. The basin, which is drained by a headwater tributary of the Río Balsas, receives a much more plentiful rainfall than does Anáhuac; at Mexico City the average annual rainfall is 23 niches; at Puebla the average is nearly 35 inches. From an agricultural point of view this district is better favored than the Basin of México. But, as we have said, Cortés was not looking for farming land.

Puebla, the city, was founded by the Spaniards in 1532. The old center of the Indian communities in this basin was Cholula—the capital city of the Toltecs. Today Cholula is of little importance except for the tourist who wishes to see its many interesting churches. Similarly Tlaxcala, the center of the Tlaxcalan Indians who, from their hilly homeland on the north of the Basin of Puebla, long defied the power of the Aztecs, has today become a place of minor importance compared with the thriving Puebla. Now Puebla is the fourth city of Mexico, with a population of nearly 125,000. It is the chief center of the Mexican cotton textile industries, and is also famous for its manufacture of tiles. Hydroelectric power is supplied from the stream which drains the basin.

The many little Indian communities which dot the floor of the Basin of Puebla and which climb the lower slopes of the surrounding hills and mountains are similar in their economy and organization to the communities of Anáhuac. The predominant crops are maize, wheat, beans, alfalfa, and maguey.

The Basin of Toluca

West of Anáhuac is the densely populated area which centers on the city of Toluca, a city of some 36,000 inhabitants. The Basin of Toluca, the highest in the Central Region, is the first of a series of basins which are drained to the Pacific through the Río Lerma. The depression in which Toluca is located stands more than 8,600 feet above sea level, but

to reach Toluca from Mexico City—a distance of only forty miles by road—it is necessary to climb above ten thousand feet over the intervening mountain range. The center of the basin is swampy, and for this reason the settlements, like those of Anáhuac, are strung along the lower slopes of the bordering hills. The crops of the basin are similar to those of the Basin of México, but with a somewhat larger proportion of the hacienda lands devoted to wheat as a commercial crop. Unfortunately, poor farm practices on the slopes have resulted in very serious losses by soil erosion. Few parts of Mexico show more vividly the devastating effects of misuse of land than do the western margins of the Basin of Toluca.

Included in this district of concentrated settlement is the old mining community of El Oro. The mines of this district, unlike those of Pachuca, have not remained productive; and El Oro itself was not selected as a political center, for the city of Toluca was made the capital of the state of México. As a result El Oro is no longer so important as the agricultural communities.

The Basin of Guanajuato

The largest of the basins, and the largest area of settlement concentration in the Central Region is in the southern part of the state of Guanajuato—the Basin of Guanajuato. Leaving the Toluca Basin, the Río Lerma plunges through a narrow gorge from which it emerges into the upper part of the Basin of Guanajuato only about 5,900 feet above the sea. The bottom of the basin is between 5,500 and 5,900 feet; but the Río Lerma cuts more and more deeply into it as it proceeds westward, forming a deep trench. The floor of the basin is made up of drained lake beds, and soils formed on accumulations of volcanic ash which are noted for their fertility. The Basin of Guanajuato has long been considered the granary of central Mexico.

The first Spanish settlements in this general district were Guanajuato city, Querétaro, and Morelia—all in the mining sections of the bordering highlands. But as mining activities decreased in these areas, the centers of population shifted. Guanajuato, with its narrow streets and its cramped space, has declined notably, having some 70,000 inhabitants in 1880, but only 16,000 in 1930. Meanwhile, the towns in the agricultural area have grown, especially Celaya (24,000), Irapuato (29,000), and León (69,000). A variety of small industries have been established in each of these towns.

Although 80 per cent of the cultivated area in the state of Guanajuato

is devoted to maize, this crop accounts for only 44 per cent of the agricultural production by value. A notable concentration of peaches and pears has appeared on the hacienda lands in the vicinity of Celaya, and these products support canning and preserving factories in the town. On the rolling hilly lands of northern Morelos, wheat is the most important commercial crop.

From a geographical point of view, the Basin of Guanajuato is of importance in modern Mexico not only because of the productivity of its farms and its factories and because of the concentration in it of relatively dense populations, but also because of its strategic position. The Basin of Guanajuato is the key to the whole northern part of Mexico. From Celaya the railroad starts northward which passes through San Luis Potosí, Saltillo, Monterrey, and eventually reaches the Texas border at Laredo. From Irapuato, the railroad starts northward which passes through Aguascalientes, Zacatecas, Durango, Torreón, Chihuahua, and eventually reaches the border of the United States at El Paso. From Irapuato a railroad continues westward to Guadalajara, thence descends to the North Pacific Region, passes through Tepic, Mazatlán, Culiacán, Hermosillo, and eventually reaches the border of the United States at Nogales in Arizona. In the revolution of 1915 the battle near Celaya was of critical importance, for the control of this town meant the military domination of all northern Mexico.

The Basin of Jalisco

Still farther to the west down the valley of the Río Lerma lies the Basin of Jalisco, second in size only to the Basin of Guanajuato. This basin stands about five thousand feet above sea level. Nestled against the base of the great volcano Ceboruco, its surface is interrupted by several small volcanic cones, now inactive, and its soils have been produced by the weathering of lava flows and ash falls. In the lowest part of the basin is the Lago de Chapala, into which the Río Lerma empties.

The Basin of Jalisco is not far from the Pacific Coast, but is not at all easy to reach from that coast. The Río Santiago (as the river which drains the Lago de Chapala is called) enters a gorge not far from the outlet of the lake, near the city of Guadalajara. In about 275 miles the river descends over falls and rapids five thousand feet to the Pacific. The gorge is quite impassable for man. In spite of these difficulties the route from Guadalajara to Tepic is the main line of travel from the central area of Mexico to the whole northwest.

Guadalajara, which was one of the primary settlement centers of colonial Mexico, has maintained its importance in the modern period. Today it is second only to the capital, having a population of 176,000 in 1930. In the rural districts around Guadalajara the population of farming people is relatively dense, and a larger area is devoted to crops for local subsistence than in the other basins of the Central Region. The land is used for the usual combination of maize, beans, chile, and alfalfa. Because of the greater humidity of this basin, wheat is of less importance than elsewhere in the Central Region.

The Valley of Aguascalientes

Two other smaller, but important, clusters of people remain to be described. One of these smaller clusters occupies the valley of the Río Verde, a tributary of the Santiago, where the mining town of Aguascalientes was founded in the sixteenth century. This place might have had a history of gradual decline similar to that of some of the other mining communities had it not been for the establishment in it of railroad shops for all the Mexican railroads. Aguascalientes is now growing, although the production of its mines is of little importance. In 1921 this town had 48,000 inhabitants, but in 1930 it had grown to 61,000.

The Valley of Morelos

The last of the seven clusters of people commonly included in the Central Region is in the Valley of Morelos, mostly in the state of that name. From the point of view of the surface features, this district should be included in the South Pacific Region, since it lies within the deep gulf of the Río Balsas, south of the volcanoes of the Central Plateau. But from the point of view of population distribution and economic connections, there is much justification for including Morelos with the higher country north of it. Cuernavaca, the capital of Morelos, is thirty-six miles from Mexico City; but it is only 4,500 feet above sea level—only a little more than half as high as the national capital. Cuernavaca has long played the role of resort city, thanks to its relatively easy accessibility to the highland centers, and to its climate—which is much more comfortable than that of the places at higher altitudes. Here is a region in the tropics in which people descend, not ascend, to seek the more moderate temperatures. In the small valley lowlands, just below Cuernavaca, sugar cane was planted early in colonial times, and Morelos became the chief source of sugar for the cities of the highlands.

The northern slopes of the valley of the Balsas are deeply dissected by the tributaries of that river. Where the surface is composed of falls of ash from the volcanoes, it is furrowed by deep, closely parallel ravines; where lava flows have been excavated by the process of river cutting, the flows stand out as prominent cliffs or detached buttes. Below Cuernavaca, the downward cutting of the rivers excavated a resistant mountain block which now stands abruptly above the valley slopes as an isolated range. In the midst of this range, explorers in the sixteenth century found a rich body of silver and tin ore: the town they founded is Taxco, now still productive as a mining center, and also as a tourist paradise.

The rural population of this northern slope of the Balsas Valley is scattered in many small and mostly isolated communities—isolated not only because of the traditional system of self-sufficient agriculture, but also because of the steepness of the slopes and the difficulty of the roads. There are many little Indian villages nestled in the valley heads almost literally under the overhanging cliffs which separate them from the world above, from the communities of the highlands which are actually only a short horizontal distance away but which are very difficult to reach. Such a place is the little village of Tepoztlán, which was described in detail by the anthropologist Redfield as an example of a self-sufficient Mexican community (232). Other small communities, such as Cuautla, occupy miniature valley basins where the existence of flat land permits the cultivation of sugar cane.

During the modern period of land redistribution, the privately owned haciendas with their large stone sugar refineries have all been abandoned, their lands expropriated. Near Cuernavaca today there is one modern sugar refinery, operated by the workers, in which the cane raised by many of the ejidos of Morelia is ground; especially large profits are still derived, as they were in the colonial period, because this district is the nearest sugar-producing area to the big market of Mexico City. The large landowners, in pushing the cultivation of cane up the gentler slopes of the valley side, caused the destruction of those slopes by gully development. But the present ejido farmers, instructed in the most modern farm techniques by the government experts, are making successful use of slopes which, under the hacienda system, were considered too steep for cane planting. Maize and other subsistence crops are raised by means of contour plowing and strip cropping. In this area one may observe not only the relict features of old Mexico—the abandoned stone mills, the gullied slopes—but also the features of the new Mexico, such as the co-operative mill and the lands farmed by the newest methods.

Relation of Political Units to Population in the Central Region

In the Central Region of Mexico an exception is found to the usual simple relationship between political areas and clusters of people (Map 123). Jalisco, to be sure, does have one nucleus of settlement and the state boundaries pass through country which is relatively empty. But most of the other states of the central area include parts of several areas of concentrated settlement, and in many instances the boundaries pass through the midst of densely populated country. A somewhat similar relationship between states and areas of concentrated settlement was previously noted in the highlands of Peru, inland from Lima.

This peculiarity has its historical background. The administrative divisions of Mexico—the states—were delimited on the basis of colonial administrative areas organized around the centers of Spanish settlement. When the modern states were created in 1824 the boundaries followed fairly closely those of the former political and ecclesiastical units. But the centers of Spanish settlement in the colonial period were the mining towns, most of which were not located in the centers of concentrated Indian settlement. Only Guadalajara and Mexico City, in the central area, were located in the midst of well-populated country. The other towns were mostly located in the mountains outside of the basins, and workers were brought to these places to labor in the mines. With the decline of mining prosperity in many of these older towns, the political centers of the states have declined in population, and new towns in the zones of concentrated settlement in the basins have started to grow. Such is the situation which is well illustrated by the state of Guanajuato in which the city of Guanajuato has declined while such new towns as Celaya have recently made important gains in population. Meanwhile Guadalajara, which was both a mining town and the center of a populous agricultural district, has continued to grow and prosper. The state boundaries drawn around the mining towns, like the boundary of the Peruvian province of Huancavelica, were located with complete disregard of the pattern of Indian settlement. In the case of Tlaxcala, this state was organized around a definite Indian culture area, which, in the modern period, is no longer distinct from the cluster of people centering on Puebla. Such are the complex backgrounds of these unusual state boundaries of the central area. To trace in detail the processes which led to the formation of the colonial administrative units, and so to the delimitation of the present state boundaries, offers an interesting and a significant problem in historical and political geography.

MEXICO AS A POLITICAL UNIT

We may now return to certain of the fundamental problems involved in an interpretation of the distribution of the Mexican people with reference to the land. The questions were posed whether the widespread condition of poverty is or is not a result of the fundamental character of the land; whether poverty results from a lack of land suitable for agriculture; and whether the concentration of people in the Central Region is an inevitable result of the relatively unchanging quality of the land, or an evitable result of the way of living. Although our survey of the various parts of Mexico brings to light a high degree of diversity of detail, certain general conditions appear to be repeated throughout the country.

Maize, which is the basis of Mexican existence, does poorly in Mexico (241). Although this grain occupies nearly 66 per cent of all the land in crops in Mexico, its yields per acre are among the lowest to be found in any of the world's important maize-growing countries. For the period 1925–29 the Mexican average yield was 8.7 bushels per acre—which may be compared with an average of 31 bushels in Egypt, 27 bushels in Argentina, 23 bushels in the United States, 22 bushels in Hungary, and 21 bushels in Italy. But figures averaged for the country as a whole obscure those regional differences which are an essential part of a geographical interpretation. The map of maize, as we have said, closely reflects the map of people—in other words, wherever the Mexicans are they raise their basic food. Since about half of the people are concentrated in the Central Region, here we find more than half of the maize. Yet in this zone of concentration, 77 per cent of the harvested maize yielded less than the average of Mexico as a whole. A concentration of maize production in the Gulf Region and a decrease of acreages in the Central Region would greatly increase the average yield per acre of the country as a whole—but without a shift of the population this would have little benefit in a country of self-sufficient communities.

Considered from the point of view of the land and its potential productivity, the Central area could be put to much better use than the growing of maize. The number of cattle could be doubled; especially is this true in the central area, where the relative freedom from pests, the abundance of surface water, the nourishing quality of the grasses all point to this as an ideal natural cattle-producing region. But we have indicated that the Mexican does not eat much meat: he averages 40 pounds of meat per year, as compared with a per capita average of 156 pounds per year in the United States, and 290 pounds per year in Argentina (241).

We cannot blame the land for these things; they are the product of tradition, and tradition is not easily broken even where it is not combined with ignorance and superstition.

The Agrarian Problem

But Mexico is doing something to break this tradition. Inherited both from the Aztecs and from the Spanish of the colonial period was the concentration of land ownership in the hands of a relatively few people. The Aztecs themselves introduced the idea of the large private property, made productive through the labor of serfs. The Spaniards carried the idea forward until only a small proportion of the productive area of Mexico was actually owned by the people who worked it. Nor did this process cease with the coming of independence from Spain. Under the Díaz regime, the concentration of ownership reached proportions unequalled anywhere else in modern times. Large blocks of public land, especially in the North, were placed in private hands as a part of a scheme to attract new settlers. Few immigrants could be induced to settle in Mexico and most of these large grants were never broken up. By 1910 there was scarcely any public land left; yet in all but five states over 95 per cent of the heads of rural families owned no land. Some eleven million rural people (out of a total population of over fifteen million) were living in small isolated communities, raising their own subsistence crops on land rented to them for that purpose, and gaining a miserable additional wage from the large landowners. Most of the Mexicans lived monotonously, in isolation, in ignorance, in extreme poverty, and plagued by bad diet and disease. Such is the dark picture which formed the background of aristocratic society in the capital in the days of Porfirio Díaz.

Revolt against this situation began more than a century ago. The revolt of 1810, which led to Mexico's independence from Spain, started as an agrarian uprising which had as its objective a redistribution of land. But leaders quickly transformed this movement into a political one. Again in 1857 a movement which brought Benito Juárez into leadership started from agrarian discontent. Juárez, who believed that the solution was private property for every individual family, only succeeded in further reducing the number and area of the communal villages which had survived up to that time.

The Mexican Revolution, which began with Madero in 1910 and ended with Carranza in 1915, set the stage for the many changes which have

come since. In a sense, the revolution is still going forward. The revolution, in this broader sense, is not a single uprising, led by men with clearly formed objectives. It has lacked a doctrine and a plan; it has consisted of a halting series of experiments, with frequent shifts between liberal and conservative. Nevertheless, the North American observer should not regard the succession of civil disorders in Mexico as simply an example of the instability which he has been led to believe is a characteristic of politics in Latin America. The various conflicts, the shifting programs of social change are all an expression of deep-seated revolt against conditions which had become intolerable.

The famous Article 27 of the constitution of 1917 [6] attempts to formulate a new concept regarding private property in land. This concept is fundamentally collectivist rather than individualistic. It is not communistic; it does not deny the right of the individual to own property, specifically property in land; but it does attempt to surround the right of the individual with restrictions determined by the needs of society. The new concept is based on a functional theory of property—that the right to own property, including land, is dependent on socially harmonious use. There is nothing new in all this; there are many restrictions on property based on socially harmonious use in the United States; but in Mexico the change came with dramatic suddenness. Since the decree of 1933 is based on experiences other nations have spent centuries in accumulating, it brings together the most advanced ideas on these social problems. Our purpose here is not to evaluate these ideas but only to show how they have led to an attack on Mexico's traditional problem of population and land.

The Ejido Program

The part of the program of reform in Mexico which touches the relation of people to the land most directly is the so-called ejido program. Certain classes of communities have been granted the right to petition and obtain land by restitution (wherever it can be shown that the land formerly belonged to the community) and by dotation (wherever, although the land never belonged to the community, it can be expropriated from neighboring properties and given to the community in proportion to the number of heads of families). Definite restrictions are placed on the kinds of communities which have the right to be set up, in this

[6] Based on the decree issued by Carranza on January 6, 1915, and incorporated in the constitution of February 5, 1917; now somewhat reformed in the decree of December 30, 1933. Treated at length in the book by Eyler Simpson (241).

way, as ejidos, and also on the proportion and kind of land which can be expropriated from private ownership. The first ejido law was promulgated in 1921; but not until after 1933 was the process of expropriation, restitution, and dotation permitted to move forward rapidly.

In certain parts of the country the development of the ejidos has gone much farther than in other parts. We have already described certain effects of the ejido program in the Laguna District, where private property in rural land has practically disappeared. Similarly in the henequen district in Yucatán, and in some of the other cotton districts of the North, collective ownership and operation have largely replaced the private hacienda. In the sugar district of Morelos, too, the ejido program has gone forward rapidly until little private land remains; here the ruins of many old sugar mills tell the story of a way of living now gone, and the new mill with the latest machinery, owned and operated by the workers, epitomizes the new era. Throughout the Central Region, the ejido program has been rapidly pushed forward in recent years, yet from this region the private hacienda and the rancho have by no means disappeared.[7]

The new agrarian communities thus set up as ejidos have made a diverse record of success and failure. Some have prospered. In some cases people have welcomed the financial assistance and technical guidance of the government, and by hard work have sought to consolidate their new prosperity. But others have failed. The contrast between the appearance of the successful ejidos and the general aspect of the surrounding country is striking: it is a contrast between the ultra-modern and the medieval; between the latest farm practices as developed by agricultural engineers and the farm practices which have come down from the early colonial period; between a people with an exciting community life and a people living in hopeless monotony.

Apparently the factors which determine success or failure are three: first, able and honest leadership in the community; second, a money crop such as maguey, cotton, sugar cane, or henequen which can pay the cost of community development; and third, land which is not only productive for the kind of crops grown, but is also so arranged that it is all reasonably accessible from the village center. Given these advantages, the Mexican people have demonstrated a capacity to work persistently and to govern themselves without resort to knives or bullets. The fact

[7] The government of President Avila Camacho, which came into office at the end of 1940, has announced the policy of insisting on the division of all ejido lands into individual private properties, although they may be worked collectively. Apparently, however, this policy will not be applied to the Laguna District and, perhaps, some others.

that some of the ejidos are successful leads one to the conclusion that the cause of poverty in Mexico is not the land, not the people, but the traditional way of living.

Industrial Development in Mexico

In addition to agrarian problems, Mexico now faces the difficulties which arise from the rapid development of large-scale manufacturing and from the concentration in cities of large numbers of industrial workers. Mexico is one of those Latin-American countries in which the social and economic diversity of the population has been greatly increased through the rise of the so-called industrial society. As in most of the countries that have been discussed, there are many small-scale manufacturing plants scattered throughout the territory. Each of these industries employs a few workmen, makes use of local products, and sells to a market which is well protected from outside competition by the high costs of transportation. These small industries are really a part of the feudal pattern—they do not indicate the presence of the urban-industrial way of living described in the introduction of this book. But in three chief areas, an urban-industrial way of living has appeared in Mexico, accompanied by the growth of large-scale manufacturing enterprises. These three areas are: first, the Federal District, which in 1930 accounted for 27.3 per cent of the national production of manufactured articles; second, the small towns along the railroad to Veracruz, especially Orizaba and Puebla, which together produced 18.1 per cent; and third, Monterrey, which accounted for 7.6 per cent of the national output in 1930. To these industrial cities come raw materials from all over Mexico; the markets are found throughout the country, but especially in the Central Region.

Industrial development in Mexico began earlier than it did in some of the other Latin-American countries. Shortly after independence from Spain, foreign capitalists built the first textile factories in Orizaba. By 1843 there were 57 cotton mills in Mexico producing the cheap cotton cloth from which the rural people make their clothing. The domestic market was then, and still is, carefully protected by a high tariff. The big era of industrial growth, however, was in the days of Díaz, when peace and tranquillity seemed to have been assured and when foreign capital was welcomed and safe. In that era, especially in the decade from 1900 to 1910, many manufacturing plants, power plants, and railroads were built. In the years of the Revolution, industrial growth ceased, but in the last two decades Mexico has continued its industrial expansion.

The manufacturing plants of Mexico make use of cheap domestic sources of raw materials, and, except for the steel mills at Monterrey and the smelters and refineries, they are all "light" industries. Cotton textiles lead in number of workers employed (15 per cent of all industrial workers in 1930) and in the value of production (11.2 per cent of all manufactured products). The textile industry is concentrated chiefly in Orizaba and Puebla and to a lesser extent in the Federal District. The industries of the national capital are varied, including plants for the preparation of foodstuffs, breweries, refineries, clothing manufactures, tobacco manufactures, and many others (231).

Industrial problems as well as agrarian problems are attacked in the present program for the reformation of Mexican life. The effect of this attack on the oil industry has already been mentioned; in other industries, also, foreign capital does not feel sufficiently secure to permit a rapid flow of new investment. But the Mexicans, who are badly in need of new capital, are nevertheless trying to prohibit the growth of large and powerful foreign business enterprises in their country which, they fear, might exert too great an economic and political pressure on domestic affairs. Among other objectives, the program of reform calls for a decentralization of industry, to be accomplished by increasing the number of small plants operated at low cost by electricity and located in many small communities throughout the country.

Mexico City

This decentralization, however, has yet to be accomplished. Mexico City is still the industrial center of the country, and its continued growth in population has yet to show any signs of being retarded.

In many ways Mexico City is a typical Spanish American capital. Its historical nucleus is the old cathedral and the government buildings facing the *Zócalo*, as the central plaza is called. To the west of this plaza is the present commercial core, built on a pattern of narrow, right-angle streets. The Mexican capital has, also, its baroque avenue, built in the nineteenth century and patterned after the Champs Élysées of Paris. This is the Paseo de la Reforma, a wide, tree-lined avenue which was laid out to provide a long, straight approach to Chapultepec Castle from the center of the city. The castle, long the residence of the Mexican presidents, stands on the summit of a hill, some 200 feet high, which dominates the city on the west. Outside of the old central section of the capital, with its strictly rectangular pattern, the suburbs are laid out

without reference to any master plan. In the modern era the lack of wide thoroughfares leading to the center of the city from the surrounding country produces almost insuperable problems of traffic congestion, but now the difficulty is being remedied by the cutting of new avenues of approach. Mexico City is being modernized, not only by the construction of new streets adequate for modern automobile traffic, but also by the building of new structures in the central district—tall office buildings of modern design which soon will make the center of Mexico City resemble the centers of all the world's metropolises.

The whole geographical city now includes a little over 1,200,000 people,[8] who are engaged in commerce, government, industry, transportation, and many other urban activities. Mexico City is the focus of everything Mexican; it is not only the political center of the country, but the center also of the social and economic activities. In Mexico City, too, are most of the business enterprises whose activities lead into the field of foreign commerce.

Foreign Commerce of Mexico

More than two thirds of Mexico's exports, in value, are from the mines and the oil fields. In 1938, the first six items were all in this category: oil, gold, silver, lead, zinc, and copper. Mexico in 1938 produced 64 per cent of all the "metals other than copper and tin" exported from Latin America. The first agricultural item stands seventh—this was henequen in 1938—which in that year made up less than 4 per cent of the total value of exports. After henequen come coffee, bananas, chickpeas, chicle, cattle, and many lesser items. Among the minerals, silver accounts for about 25 per cent, gold about the same, lead about 20 per cent, zinc about 13 per cent. Among the lesser minerals are antimony (a resource of great importance to the United States, which lacks this mineral), iron, cadmium, molybdenum, and others. The importance of the North and the Gulf regions in terms of exports is striking in view of their relatively small population.

Before the outbreak of the Second World War the United States held a predominant position in Mexican exports. In 1939 about 72 per cent went to the United States, and about 7 per cent to Germany. In terms of commodities the United States took most of the silver, copper, hene-

[8] The political city does not occupy the whole of the Federal District. Certain politically independent, but geographically connected suburbs, such as Tacubaya, should be included in the metropolitan area.

quen, and bananas; Germany took most of the zinc, coffee, cotton, and part of the lead; Great Britain took part of the lead, and most of the oil.

The imports were made up chiefly of machines, products manufactured by heavy machinery, and foodstuffs. The United States supplied nearly 62 per cent of the imports in 1939, and Germany supplied about 16 per cent—France and Great Britain less than 5 per cent each. Automobiles, grains, and petroleum products were the leading items. Most of these entered through Veracruz, or came by rail from the United States, and found their market in the cities of the Central Region.

CONCLUSION

Mexico does seem to have a little of everything. Perhaps more than most countries it merits the use of that very trite phrase "a land of contrasts." There are so many varieties of lands and peoples included in its territory that to generalize too freely about Mexico or Mexican problems only obscures the realities.

Cortés looked at Mexico early in the sixteenth century, and what he saw was superlatively good. If he could have realized that up to 1940 Mexico would produce about seven billion ounces of silver out of a total world production of about sixteen billion ounces, he would have been even more enthusiastic than he actually was in reporting to his king. And in addition to the silver, which men valued very highly in Cortés' day, Mexico has since produced a long list of new industrial metals and oil, which the colonial Spaniards did not know how to utilize. In terms of these things Mexico is a very rich country.

But Mexico is also a poor country. And the causes of its poverty cannot be described in one simple sentence, nor are the remedies so easily apparent that they can be prescribed in one dose to be applied equally throughout the land. First we must understand the principle that the land itself cannot be described as rich or poor, good or bad, favorable or unfavorable. The land is entirely neutral. Then, so far as possible without prejudice, we should try to follow man's experience with this land over the long course of history. We observe the changing significance of the elements of the physical background with the changing techniques and objectives of the people. From this point of view there is nothing inevitable about the poverty of Mexico.

Mexico is a poor land for farming as long as the predominant crop is maize. It might be very good country for beef or dairy cattle, especially in the Central Region; or it might produce better maize, if the center of

production could be shifted to the warmer and wetter sections of the country. There can be no doubt that the tierra caliente of the Gulf Region contains great potentialities for an increase of crop production—including tropical specialties for export. Without some increased productivity the government will find great difficulty in financing the costly experiments in social reform designed to attack this problem of poverty at its source. And without increased productivity, the continued increase of population can lead only to greater and greater poverty.

The difficulties to be overcome are enormous. With all the traditional contrasts between Indian and European, between landowner and peon, and between isolated, self-sufficient rural villager and urban wage earner, to establish in Mexico a coherent, integrated society will require years of effort with strong fearless leadership. Communities which are isolated must be integrated into the national whole; self-sufficiency must be given up for interdependence, and each community must be taught to produce a surplus of something to exchange for things produced to advantage elsewhere. The agriculturally productive lowlands must in some manner be connected with the industrially productive highlands. But the vision of a widely integrated nation composed of interdependent parts is too new in Mexico to be commonly understood—and without common understanding and support, no reform movement is on safe ground.

Meanwhile we who stand on the sidelines and watch must learn to watch with sympathy and understanding. To many the program of reform can seem only destructive. But there is the broader view which reveals the fundamental struggle toward social coherence which Mexico, alone among the predominantly Indian countries of America, has undertaken.

21

REPÚBLICA DE GUATEMALA

Total area, 48,290 square miles

Total population, 3,284,269

Capital city, Guatemala City; population, 166,456

Trade per capita:

Imports: $9.24
Exports: $7.21

Unit of currency, quetzal ($1.69, gold content value)

Major commercial products in order of value:

coffee	lumber
bananas	honey
chicle	sugar
gold	hides

Railroad mileage, 737

(The above statistics are for the year 1938.)

21

GUATEMALA

GUATEMALA, even more than Mexico, is a predominantly Indian country. The great majority of its people live in small, isolated village communities, raising their own subsistence crops of maize, and having few contacts and few interests beyond the immediate locality. A minority, composed chiefly of people of European ancestry, controls the political life, and, through the use of relatively inexpensive labor, produces commercial crops which in normal times bring considerable profit to themselves and to the public treasury. Between these two groups there is the same wide gulf which separates similar groups in all the predominantly Indian countries of Latin America. But in Guatemala there is one important peculiarity: there is still an abundance of free land suitable for the kind of agriculture practiced either by the Indian or by the commercially minded white man. There is no agrarian problem.

THE PEOPLE

Guatemala has the largest population of any country in Central America (Map 144). In fact, something like 38 per cent of the people who occupy the Isthmus between the southern border of Mexico and the northwestern border of Colombia are in Guatemala. Yet only the southern third of the country is densely populated (Map 121). In the high basins of the mountains bordering the Pacific coast there are densities comparable with those of the central area of Mexico. The whole northern third

of the national territory, on the other hand, contains almost no permanent settlements—this is the part which lies in the tropical forests of the Yucatán Peninsula. The remainder of the country is only thinly populated, and there is ample room at all the different altitude zones either for new settlement or for the expansion of settlements already established.

The rate of population increase is somewhat more rapid than that of Mexico, but not rapid enough to give rise to any important expansion of the settled areas. When Guatemala became independent of Spain near the end of the first quarter of the nineteenth century, it was estimated to have about 500,000 inhabitants; in 1865 there were some 1,180,000. A census taken in 1921 showed that Guatemala then had 2,004,296 inhabitants; and the latest estimates place the figure at a little more than 3,000,000. The birth rate is very high—one of the highest in Middle America; but the mortality rate is also very high. Population increase comes almost entirely from the excess of births over deaths, for the number of immigrants has been very small.

The population of Guatemala remains overwhelmingly Indian. At the time of the 1921 census it was estimated that something like two thirds of the people were pure-blooded Indians, chiefly of Mayan origin, and that about one third were mestizos. Less than 1 per cent of the total were Europeans of unmixed white ancestry. These proportions are still approximately correct.

THE LAND

Most of these people live in the highlands which form the backbone of Central America. These highlands, together with the more thinly populated lowlands, are similar to the surface features described for the southeastern part of Mexico; and the same features continue southeastward into El Salvador, Honduras, and northern Nicaragua.

As in the Mexican state of Chiapas, the Pacific coast of Guatemala is followed by a belt of lowland (Map 118). At the border of Mexico and Guatemala this plain is between twenty-five and thirty miles in width, but it becomes narrower toward the south, and is finally pinched out in El Salvador. Because of the abundant rains of the summer rainy season, the coastal lowland is covered with a dense rain forest, with patches of wet savanna in the coastal lagoons. The three Guatemalan ports on the Pacific—Ocós, Champerico, and San José—are all open and unprotected, requiring that ships lie at anchor well offshore.

On the inner margin of the coastal lowland the highlands rise abruptly to a general elevation between eight and ten thousand feet. All the high-

land region from the Isthmus of Tehuantepec to the lowland of Nicaragua is composed of underlying ancient crystalline rocks with structures which run in a general east-west direction, and a cover of recent volcanic material which is thickest along the Pacific coast and which disappears as one crosses the isthmus toward the Caribbean. The highlands, therefore, can be divided into two different parts: the *southern highlands* where the lava and ash cover the older rocks, and which are surmounted by active volcanoes; and the *central highlands* where the crystalline rocks are exposed at the surface.

The general elevation of the volcanic highlands along the Pacific increases as one travels from Chiapas southeastward into Guatemala. This fact is explained by the increase of volcanic activity and the greater depth of the accumulation of lava and ash. Active volcanoes stand boldly above the general highland level, and earthquakes recur with disconcerting frequency. The highest volcano is Mt. Tajamulco, which rises more than 13,800 feet above the sea. Among the volcanic cones there are many intermont basins of irregular shape, five of which are large enough to be shown on the map (Map 118). These basins are between five and eight thousand feet in altitude; it is in them that the people of Guatemala are closely concentrated (Map 121). The southern highlands are drained mostly toward the east by streams that enter the Gulf of Honduras, and only short streams descend directly to the Pacific. One basin, west of Guatemala City, has no surface outlet: this is the depression, rimmed by great volcanoes, which holds the magnificent Lake Atitlán.

The cover of lava and ash thins out toward the north and east, and in the central part of Guatemala the underlying geologic structures appear at the surface. The central highlands, which are beyond the volcanic area, are not so high as the mountains nearer the Pacific, but they are more rugged. The rocks are tightly folded and faulted parallel to the fold axes, forming a series of steep-sided ranges, separated by deep longitudinal valleys which trend in an east-west direction. Most of the surface of this part of Guatemala is steep: there are a few small areas of gently sloping land in the tierra fría and there are narrow valley and coastal lowlands almost at sea level in the tierra caliente; but in between, in the tierra templada, the surface is one of sharp ridges and narrow ravines.

The three deep valleys which point eastward to the Gulf of Honduras are low, rainy, and hot. The southernmost valley is drained by the Río Motagua, a river which rises among the volcanoes of the southern highlands. The middle lowland is occupied by the shallow and swampy Lago

de Izabal. The northernmost lowland, located on the border between Guatemala and British Honduras, is drained by the Río Sarstún.

In general, the highlands of Guatemala receive plenty of rain and are covered with forests. The tierra fría is characterized by forests of pine at the higher elevations, and by broadleaf forests in which oak is a prominent species lower down. Tropical evergreen forests occupy the lowlands. There are several dry spots, however, where low rainfall and rapid drainage combine to make forest growth impossible. Such areas are commonly occupied by savannas, but the middle part of the Motagua Valley, northeast of Guatemala City, is so dry that only cactus and other xerophytic plants can survive in it.

The northern part of Guatemala is a scantily inhabited wilderness in the forests of the Peninsula of Yucatán. The surface is a limestone tableland, mostly between five and seven hundred feet above sea level. The drainage is underground, except for the lakes which fill and spread over the surface after heavy rains. The whole country is densely covered with tropical rain forest, in the midst of which lie the all but completely hidden ruins of the Maya cities, now only visible from the air. Very little of this northern province of Guatemala can be considered a part of the effective national territory.

THE PATTERN OF SETTLEMENT

In Guatemala, as in Mexico, the distribution of Indians in the preconquest period has been reproduced in the modern patterns of population. The high basins of the southern highlands were occupied by a relatively dense group of sedentary agricultural people whose basic food crop was maize. The present town of Quezaltenango was the focus of this pre-Spanish settlement. Outside of this highland area, the rest of what is now Guatemala had a relatively small population of shifting cultivators or nomadic hunters and fishers.

The Spanish conquest entered Guatemala from Mexico during the first decade after Cortés had founded Mexico City. The first expedition reached the southern highlands in 1523, and founded the first Spanish town on the site of the present Guatemala City in 1524. Antigua, founded in 1541, became the political center, and its authority was extended over the territory southeastward as far as Panamá. About this same time other Spanish towns were established, including one of the first of the Spanish missions, founded by Las Casas at Cobán in 1544.

Compared with the highlands of Mexico, Guatemala yielded little in

the way of mineral wealth. To be sure, silver mines were opened up near Huehuetenango, and these mines are still productive (Map 120). But the opportunities for quick wealth were not enough to keep many of the original explorers from moving on to other areas, or to attract any very large current of later settlers. Most of those who came to this region to remain as landowners, making use of the abundant Indian labor to produce commercial crops, settled in the southeastern part of the southern highlands, around Guatemala City and Antigua, leaving the northwestern part of these highlands to the Indians. The Spaniards who came to Guatemala were not numerous enough to divide all of the territory into private haciendas.

Many times in the course of its history earthquakes have destroyed the settlements in Guatemala. The old capital of the country, Antigua, was devastated in 1773; and so frequent were the destructive quakes at that site, that the Spaniards decided to shift their seat of government to the present Guatemala City. Although perhaps a little safer than Antigua, the new capital has suffered frequently, being almost completely destroyed in the big earthquake of December and January, 1917–18. Today the buildings of this city of nearly 165,000 are all low, and are spread widely over the floor of the intermont basin.

Indian Subsistence Farmers

The dense concentrations of people in the northwestern part of the highlands, centering on Quezaltenango and Huehuetenango, are composed predominantly of Indians. In each little town can be found probably a priest and perhaps one or two German retail merchants with Indian wives; but people who are not pure-blooded Indians probably make up less than 1 per cent of the population. The Indians live much as they have lived for many centuries. Although they worship at the Catholic Church, the forms of Christianity are used to express an essentially pagan attitude. Many of the costumes which differentiate the people of one part of highland Guatemala from those of another part are survivals of old seventeenth- and eighteenth-century Spanish types of dress. Many of the tunes the Indians sing are old Spanish tunes. But the people who wear these clothes and sing these songs have changed their essential forms of daily living or their essential attitudes and objectives very little since the first days of the Spanish conquest. The Indian scarcely comprehends the white man's desire for commercial profit, and in Indian society prestige is not gained by the ownership of land.

Indian agriculture is still based on the cultivation of maize for local use, and although there is a well-developed system of periodic fairs and markets, each community remains economically self-sufficient. The Indian market here, as in Mexico, is not primarily a commercial institution. Although the Indian may transport his little surplus of food, or the articles manufactured in his home, for as much as a hundred miles to a fair, he will not ask a price there which is greater than the price he would ask in his own village. Commerce is carried on for the social contacts it affords. The sale of a few items simply provides the excuse for a day or even several days spent on the road. In spite of all the coming and going which the traveler observes along the roads and trails of the country, each community is quite independent of the products of other communities.

Commercial Agriculture

The people who have adopted the European way of living, on the contrary, attempt to produce something with sufficient value to stand the high costs of transportation to distant markets, and to bring in enough income to make possible the purchase of things which the local area does not produce. Mining was never sufficiently important in Guatemala to offer serious competition with agriculture, although small silver mines are still worked in parts of the highlands, and placer gold mines in the stream gravels are operated at intervals in many scattered localities.

The commercial crops of Guatemala have changed considerably in the course of history. The Spaniards introduced sugar cane, wheat, and domestic animals; and they adopted several of the crops of the Indians, especially cacao and indigo. In the second quarter of the nineteenth century they brought in cochineal insects which were fed on a variety of cactus known as *nopal*. From the insects a kind of red dye was manufactured. Cochineal and indigo were of major importance around Antigua and Guatemala City until the discovery of chemical dyes in 1857 put an end to the market for the more costly agricultural dyes. Since that time two chief commercial crops, both introduced from elsewhere, have dominated the commercial life of Guatemala, each concentrated in a different part of the country. These crops are coffee and bananas.

Coffee and the Coffee Planters. With the collapse of the indigo and cochineal business, the planters of highland Guatemala turned to the production of coffee, which had already proved its value in other parts of

Central America. For the last sixty years, coffee has been the leading export of the country. The success of this form of plantation economy in Guatemala, as in other parts of Central America, is based on a combination of especially favorable climatic conditions and an adequate supply of cheap labor. Coffee of the most desirable flavor is produced where the temperatures average in the 60's and 70's and where the rainfall is concentrated in one season—conditions which are met ideally in the tierra templada of Middle America. As in Mexico, so here the Indian workers are not only paid extremely low wages, but are also detained in the service of the large plantation owners through a system of debt bondage, or peonage. If higher wages were paid, coffee from the isolated mountainous regions of Middle America, mostly produced inefficiently from small areas, could scarcely meet the competition of other regions—such, for example, as São Paulo in Brazil—which are not only climatically suited for coffee, but are also equipped to develop large-scale plantations.

There are two kinds of coffee planters in Guatemala. The planters around Guatemala City and Antigua are people of Spanish or mestizo descent whose ancestors have lived in Guatemala for many centuries. The large landowners of this section form the aristocracy of the country, the class which holds the chief political power and occupies the position of highest social prestige. The land is worked by Indian tenants and peons.

The second kind of coffee planter is a relatively recent comer to Guatemala. He is a German, probably a descendant of those who emigrated from Germany between 1860 and 1870. The German colonists settled as pioneers in two chief localities: on the Pacific slope of the northwestern part of the highlands, overlooking Ocós and Champerico; or in the rugged central highlands between Huehuetenango and Cobán. Attempts by the government of Guatemala to establish settlers in the eastern part of the country before the middle of the nineteenth century had failed; but here, as elsewhere in Latin America, the Germans demonstrated their abilities as woodland pioneers. Although foreigners made up only about 1 per cent of the landowners of Guatemala in 1935, they owned over 30 per cent of the cultivated area. About 48 per cent of the large properties of the country in that year were owned by foreigners, mostly Germans. In 1935–36 the German planters produced 64 per cent of Guatemala's coffee.

Successful as the German planters have been, they have developed no important areas of expanding settlement as they have in Southern Brazil. Many of the successful planters have left the rural districts and have be-

come retail merchants in the towns. In the parts of Guatemala where the German coffee planters are still numerous, the population density is not high, and the plantations are widely spaced. The work is done by Indian tenants and peons, just as on the estates of the Guatemalan aristocracy.

The Banana Plantations. An entirely different kind of foreign penetration and a different kind of commercial agriculture has come to Guatemala through the planting of bananas. Banana cultivation, too, has led to the development of the tierra caliente—a part of the country which was left almost unoccupied before the banana era began in 1906.

In this year the United Fruit Company established its first banana plantation in Guatemala in the lowland of the Río Motagua, inland from the sleepy little village of Puerto Barrios. Since 1906 this company has extended its plantations widely over the valley lowlands of eastern Guatemala, importing Negroes from Jamaica as laborers. Puerto Barrios has been transformed into a thriving banana port, complete with the special loading devices used in the transportation of bananas. Railroads have been built throughout the plantations, and also across the country through Guatemala City to San José on the Pacific.

In the last few years an important shift has come in the area of banana planting. As recently as 1934 nearly 88 per cent of the bunches were produced in the valley of the Motagua and other parts of the eastern lowlands. But the spread of certain plant diseases was threatening the industry, and the United Fruit Company decided to attempt the cultivation of this crop on the Pacific side. Plantations, therefore, were laid out chiefly near the base of the southern highlands along the railroad to San José. In 1938, 62 per cent of the banana production still came from the eastern part of the country; but in 1939 nearly 53 per cent came from the Pacific side, being shipped across the isthmus by rail. Few Negroes have been brought to the Pacific side; here the workers are mostly Indians brought down from the highlands.

The extent to which the United Fruit Company has benefited the economic life of Guatemala or has destroyed the independence of action of that country is one which need not be discussed here. Whether we think of the pressure which the company was able to exert in domestic affairs as justified and on the whole beneficial, or whether we think of it as the impact of just one more foreign group attempting to exploit the land, the fact remains that the banana interests have been able to penetrate just as deeply into the political life of Guatemala as the coffee planters were ever able to do.

GUATEMALA AS A POLITICAL UNIT

The foreign exports of Guatemala during the last two decades have been almost entirely made up of two products—bananas and coffee; and its trade has been principally with two countries—the United States and Germany. Nearly 60 per cent of the cropland of Guatemala is used for the production of noncommercial maize; and the two products which now dominate the exports are produced on a relatively small proportion of the land (coffee on a little less than 20 per cent of the cultivated area; bananas on a little over 5 per cent). Coffee normally accounts for between 50 and 60 per cent of the value of exports, and coffee and bananas together for about 90 per cent. In 1938 Guatemala stood fourth among the coffee-producing countries of Latin America, exporting 4 per cent of the total. In 1938–39 the United States took 60 per cent of Guatemala's coffee and Germany took 15 per cent; but since almost all the bananas go to the United States, this country took nearly 71 per cent of Guatemala's total export trade while Germany took 11 per cent. Of the imports in 1939 the United States supplied over 54 per cent and Germany 27 per cent.

These various commercial activities touch directly the lives of only a small minority of the Guatemalans. Foreigners began exploiting the Indians and their land four hundred years ago. More recently two other foreign groups, the Germans with Indian laborers, and the North Americans with the help of Negroes and Indians, have continued the search for wealth, for El Dorado. The country remains, however, overwhelmingly Indian; and the Indian majority has almost no share in the commercial and political life of the country. The Guatemalan Indian, however, has escaped the worst effects of commercial exploitation because there is still no pressure on the limits of available land. In the highland regions there is still public land which can be occupied either in accordance with the Indian manner of living, or for the production of the white man's commercial crops. In the lowlands on either side there is a vast area almost untouched in which tropical specialties could be produced. Already the government is attempting to make some use of the forests of Petén by gathering wild chicle and shipping it out to Puerto Barrios by airplane. In the presence of unoccupied land, and of resources waiting to be exploited, Guatemala remains a potential pioneer country. This fact conditions all its internal problems, and decreases the severity of the impact between the minority of commercially minded whites, and the majority of self-sufficient, conservative, and noncommercial Indians.

22

REPÚBLICA DE EL SALVADOR

Total area, 13,176 square miles

Total population, 1,744,535

Capital city, San Salvador; population, 102,316

Trade per capita:

Imports: $5.60
Exports: $6.70

Unit of currency, colon ($.846, gold content value)

Major commercial products in order of value:

coffee	balsam
bullion and specie	rice
sugar	indigo
henequen	

Railroad mileage, 378

(The above statistics are for the year 1938.)

22

EL SALVADOR

THE THEME of great diversity of land and people which runs as a predominant note through all of Latin American geography is of special significance in Central America. And nowhere is it illustrated more vividly than in the contrasts which distinguish little Salvador from its neighbors. The 1,700,000 people who live in this country form one distinct cluster, centered around the city of San Salvador. In the central area the density of population is greater than in any other part of Central America and Mexico except the highlands of Costa Rica—over 125 per square mile; toward the boundaries of the country the density decreases, but no part of the 13,000 square miles of national territory remains unoccupied. Only Salvador and Uruguay in all Latin America can claim that the effective national territory and the total national territory are the same.

The population of Salvador is much more nearly homogeneous than that of Guatemala. More than 80 per cent are mestizo; less than 20 per cent are pure-blooded Indians; and there is a fraction of 1 per cent of people of unmixed Spanish descent. Furthermore, Salvador is a land of small properties on which the farmer proprietors have achieved a considerable prosperity in modern times through the planting of coffee. Salvador has taken full advantage of the peculiar quality of its land. In one way or another this smallest of the Latin American countries stands in strong contrast to its neighbors, Guatemala, Honduras, and Nicaragua.

THE LAND

The backbone of Salvador is a volcanic highland which is a southeastward continuation of the southern highlands of Guatemala (Map 118). In Salvador the intermont basins are much lower than they are farther to the northwest—only a little over 2,000 feet in altitude at San Salvador. Surmounting the highland there are two more or less parallel rows of volcanic cones, the highest of which are only a little over 7,000 feet. The surface of the highland is deeply mantled with ash and lava which weathers into a deep, porous soil. Much of the lava is a diabase which produces a soil not unlike the terra roxa of Brazil. The relatively low elevation barely raises the intermont basins of the highland to the upper limits of the tierra caliente. The temperatures are not excessively high—averaging 73.6° at San Salvador with a range of only about 5°. The rainfall comes in one rainy season, from the end of May to October; the rest of the year has only light rains.

This highland backbone is bordered on either side by lowlands. Along the Pacific Coast the lowland of Guatemala continues southeastward beyond the port of Acajutla. Where the valley of the Río Lempa crosses the volcanic highlands to reach the coast, the lowland is as much as twenty miles wide. But between Acajutla and the mouth of the Lempa the lava flows of the highland country descend to form rocky promontories along the Pacific.

On the northern side of the volcanic highland is the wide valley of the Río Lempa, a structural depression which first makes its appearance in western Salvador. For a little over a hundred miles this wide, savanna-covered lowland separates the highlands of Salvador from the basalt cliffs to the north which mark the edge of the highlands of Honduras. The Río Lempa itself passes across the highland of Salvador to reach the Pacific, but the structural depression continues southeastward, descending until it is invaded by the Gulf of Fonseca on the southeastern border of Salvador.

THE PATTERN OF SETTLEMENT

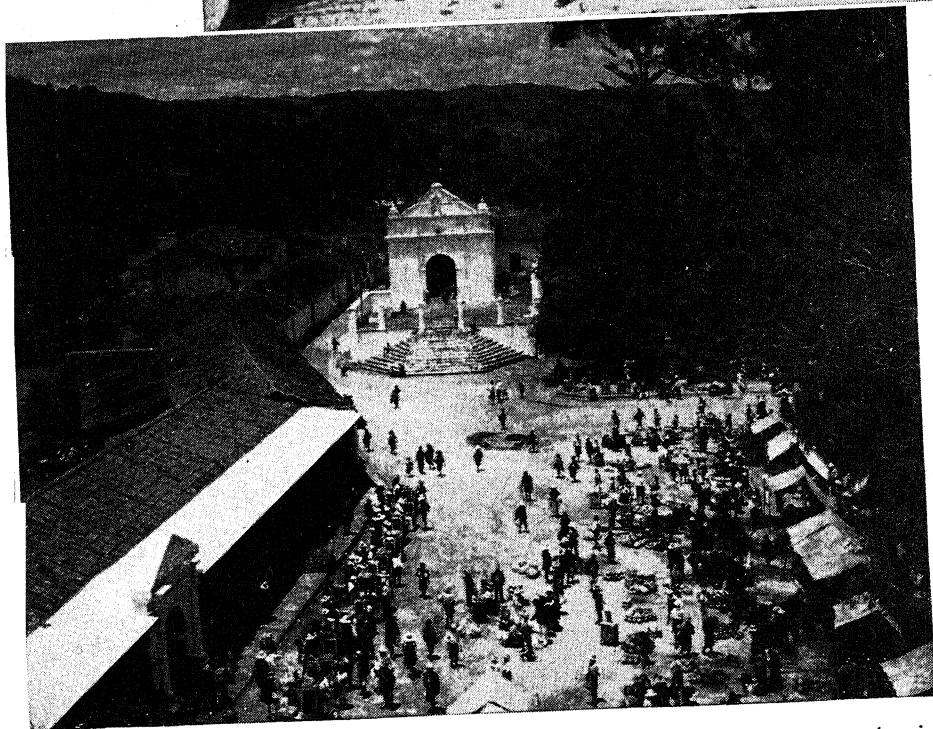
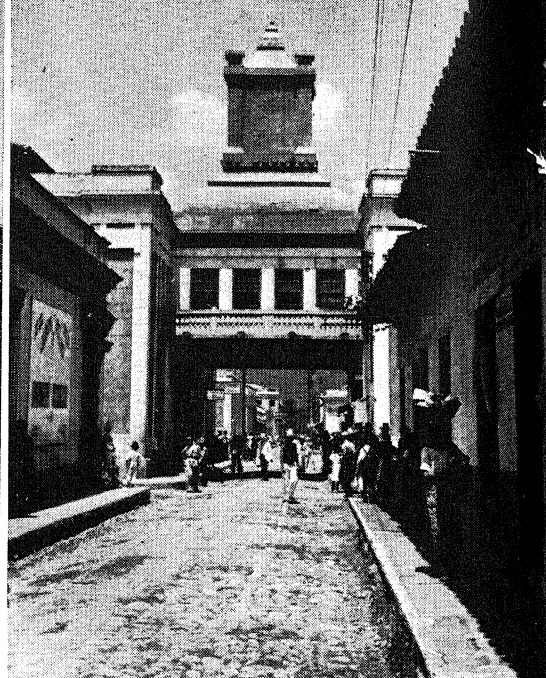
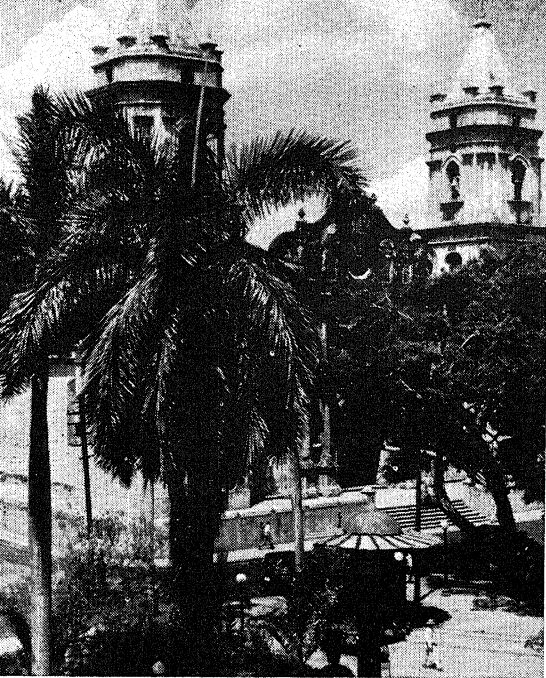
For many centuries the territory which is now El Salvador remained isolated and neglected by the Spanish conquerors. Its position midway between the colonies sent out from Panamá to the lowland of Nicaragua and the colonies sent out from Mexico into Guatemala makes Salvador and Honduras the most remote parts of the isthmus in terms of Spanish colonial settlement. Furthermore, there were neither precious metals

nor large populations of sedentary agricultural Indians to attract the Spaniards. The few colonists who settled in what is now Salvador mixed with the peaceful but relatively scanty Indian population to form a small and homogeneous mestizo group. The savannas of the Lempa Valley were used for the grazing of cattle, and subsistence crops were raised on small properties on the highlands. When Salvador broke away from Guatemala to establish its own political independence, its population numbered no more than a few hundred thousand, dominated by a small group of people of unmixed or nearly unmixed white ancestry in the capital city, San Salvador. Even as late as 1879, Salvador had only a little more than 500,000 inhabitants, among whom the sentiment of nationality had been blown to a white heat by the alleged aggression of both Guatemala and Nicaragua.

Coffee Plantations

Modern Salvador—prosperous, peaceful, and nationally coherent—is a product of the last sixty years. During the last quarter of the nineteenth century, certain of the more alert planters of the highland region began to appreciate the possibilities of coffee production. In spite of the relatively low altitude of most of their plantations, they did possess one great advantage over most of the other coffee producers of Central America—easy access to the coast. Because of cheap transportation, therefore, the Salvadorean planters were in a position to take advantage of the rising world market for coffee. These planters, most of them of nearly unmixed Spanish ancestry, became the coffee aristocracy—the so-called "forty families" of Salvador, in whose hands is carefully maintained the political and economic power and who enjoy the highest social prestige. It is these people primarily who have made San Salvador, now with a population of over 100,000, into a modern city with beautiful buildings and plazas.

The cultivation of coffee on large estates was followed by a popular wave of coffee planting on small estates. In 1939 there were 11,545 coffee plantations, or *fincas*, owned by 10,921 proprietors, and covering 202,432 acres. As a result of the fact that coffee prosperity was thus spread over a fairly large part of the population, an increase in the rate of population growth appeared. By 1930 Salvador had nearly 1,500,000 inhabitants; and according to the estimate of 1938 there are now more than 1,700,000.

This increase of population has not yet led to any marked increase in

Lake Atitlán (*above*) is in the highlands of Guatemala. Encircled by volcanic peaks, its shores dotted with twelve native villages (each named after one of the Apostles) and its waters a constantly changing shade of blue — here is one of the most beautiful and picturesque places in the Western Hemisphere. Below is the colorful Indian market at Chichicastenango, which is held every Thursday and Sunday. The church in the background was built shortly after the Spanish conquest. Here priests wrote down and preserved the "Popol Vuh," a record of

At the upper left is a plaza in Panama City. Partly showing through the trees is the Cathedral — a splendid example of Spanish colonial architecture. At the upper right is a view of one of the old streets in Tegucigalpa, capital of Honduras. The Mercado de los Dolores, in the background, illustrates a type of architecture which is fast disappearing. The passageway over the street is a great convenience to people on the upper floor. Below is a street scene in San Salvador, capital of El Salvador. In the foreground is a not-too-busy filling station.

the area of settlement. Coffee planting is not likely to spread very far from the area it now occupies in the highlands, for 2,000 feet is near the lower limit for coffee. The only expansion possible, other than a more intensive use of the highland area itself, is an advance up the slopes of the volcanoes, which become steeper the higher one goes. Such an "internal frontier" of expanding settlement has actually appeared in Salvador, for small coffee fincas are now laid out well above 4,000 feet in elevation, clinging precariously to the volcanic slopes.

EL SALVADOR AS A POLITICAL UNIT

Salvador is distinctly a one-crop country so far as its foreign commerce is concerned. To be sure, maize is the crop which occupies the largest area; but coffee, in the period from 1928 to 1934, made up regularly from 92 to 95 per cent of the value of all exports. Signs of a more diversified commercial agriculture began to appear in 1938, when the proportion of coffee dropped to 87 per cent, and especially in 1939, when coffee made up only 84 per cent of the exports. This drop was not the result of a decrease in production of the basic crop, for actually coffee shipments increased in 1939 over 1938; it was the result of a greater attention to other forms of production, especially sugar cane, balsam wood, and henequen. The greater part of the exports go to the United States—61 per cent in both 1938 and 1939; from the United States, likewise, come most of the imports. Germany was the second best customer, taking 10 per cent of the exports and supplying 21 per cent of the imports in 1938.

Coffee prosperity has done much for Salvador. The construction of new buildings, the extension of railroads and automobile highways, the completion of port works at La Unión on the protected Gulf of Fonseca—all are evidences of a vigorous economic life. To be sure, closer contact with the outside world reduces the degree of invulnerability to wars and financial crises; the impact of the Second World War on El Salvador, for example, may be estimated from the fact that of the coffee exports in 1939 as much as 25 per cent went to Germany, Norway, Sweden, Holland, Finland, and Italy. Nevertheless, coffee prosperity has strengthened rather than decreased the differences which separate Salvador from its Central American neighbors, and has given this little republic a distinctive place among the Latin-American nations.

23

REPÚBLICA DE HONDURAS

Total area, 46,332 square miles

Total population, 1,038,061

Capital city, Tegucigalpa; population, 40,000

Trade per capita:

Imports: $9.83
Exports: $7.64

Unit of currency, lempira ($.846, gold content value)

Major commercial products in order of value:

bananas	livestock
gold and silver	tobacco
coffee	hides
coconuts	

Railroad mileage, 816

(The above statistics are for the year 1938.)

23

HONDURAS

HONDURAS is the second largest of the Central American states in terms of area; but its population of only about one million is much less than that of its little neighbor, El Salvador. A large part of northeastern Honduras lies beyond the effective national territory, and even in the southwest, where the chief highland centers are located, the population is grouped in small communities in the midst of large areas of very scanty settlement. Honduras faces the problems of low population density, and these problems are complicated by the great diversity of the land, and—since the planting of bananas was started along the Caribbean coast—by the racial diversity of its clusters of people.

Estimates of the racial composition of the population of Honduras have little value. The region was very thinly occupied by Indians when the Spaniards arrived, and for this reason the proportion of pure Indians in the present-day population must be very small. The chief concentration of people in which Indian blood predominates is near the Guatemalan border around the old Maya city of Copán[1] (Maps 112 and 121). The population of the other highland communities is a fairly homogeneous mixture of Spanish and Indian. People of pure Spanish ancestry, as in Salvador, probably make up less than 1 per cent of the total. Since the establishment of banana plantations on the coast, a new racial element has appeared—the Jamaica Negro. The communities of the Caribbean coast are predominantly black.

[1] Not to be confused with Cobán in the central highlands of Guatemala.

slopes. It ascends to higher altitudes on those mountain sides which, being oriented toward the east, receive heavy rains from the prevailing easterly winds. In valleys and basins or on mountain slopes which are protected from the rain-bearing winds, the oak-pine forests, characteristic of the tierra templada and the tierra fría, may descend as low as 2,000 feet. No parts of the country are high enough to extend above the tree line; but there are extensive savannas in relatively dry places, such as the district east of Tegucigalpa. No part of Honduras is so dry as the middle valley of the Motagua in Guatemala.

THE PATTERN OF SETTLEMENT

Although the country east of the limit of the Mayas was only thinly occupied in the pre-conquest period by shifting cultivators of maize or primitive hunters and fishers, the Spaniards nevertheless pushed on southeastward from Guatemala City, seeking sources of wealth. In 1524 they came upon silver ores, and in a basin near the mines they founded the town of Tegucigalpa. The mines did not prove to be very rich, but they were rich enough to attract a small number of immigrants who came over the rough trails from Guatemala City. During the centuries which followed, this small group of settlers, together with new groups from Guatemala, established a number of small communities in the southwestern part of the country, most of them along the road which connected Tegucigalpa with Guatemala City. Chief among these settlements were La Esperanza and Comayagua (Map 118). In the course of time, a thin population was spread over most of the southwest, but the north and the east were almost entirely neglected.

The Highland Settlements

The southwest of Honduras, from Tegucigalpa on the east to the Guatemalan border, is still the part of highland Honduras in which the chief settlements are found. There is an important cluster of people around the old Maya center of Copán; and another cluster which centers about the second largest town of Honduras—La Esperanza. In both these areas maize is the crop which occupies the largest area, and the chief commercial products are coffee and cattle. Around La Esperanza there is a small additional commercial production of wheat and fruit. From both Copán and La Esperanza, settlements have been extended slowly toward the north, along the several separate ranges which reach toward the Caribbean. Small towns and scattered plantations are found

all the way to the edge of the Ulúa lowland, where Santa Bárbara and San Pedro Sula are the chief centers.

Comayagua, in the rift valley, was for a long time the leading town of the highlands of Honduras. Founded in 1540 on the road between the silver mines and Guatemala, it became the political center of this part of the Spanish domain, and continued to perform the functions of local administration until Tegucigalpa was selected as the capital of independent Honduras in 1827. The settlements which are grouped in the rift valley around Comayagua, like those farther west, grow maize for local subsistence, and produce coffee and cattle for sale.

Tegucigalpa, the capital and chief city of Honduras, is located at an elevation of about 3,000 feet in the midst of hilly and mountainous country. Its site is one of the most beautiful and its climate one of the most comfortable of all the Central American capitals. The population of Tegucigalpa is only 40,000, and the density of the population in the surrounding area of concentrated settlement—the chief population cluster of Honduras—is only between 10 and 25 per square mile. The silver mines nearby are still active; and from the farms around the capital come coffee, tobacco, and cattle. These commercial activities supplement only to a minor degree the main business of Tegucigalpa, which is politics. The capital is not reached by a railroad, but motor roads now connect it with the Caribbean ports and also with a port on the Gulf of Fonseca.

East of Tegucigalpa the population is sparse and widely scattered. The savannas of the district around Juticalpa afford natural pastures which are utilized for the grazing of cattle, but they are by no means used to capacity. In some of the stream gravels of the valleys near the Nicaraguan border temporary placer works in some years produce a little gold. None of these activities, however, supports any important numbers of people. The country east of Juticalpa is little known.

The Settlements of the Caribbean Coastal Lowlands

The Caribbean Coastal Lowlands were long neglected by the Spanish settlers of Honduras. Hot, moist, abounding with fever-carrying insects, covered with a dense rain forest, this part of the country was definitely unfavorable for settlement in the colonial period. In fact, the whole rainy Caribbean coast from Yucatán to Colombia was considered to be one of the most unhealthful parts of the world in that period. Only in modern times has the Caribbean coast become commercially the most productive part of Honduras.

The occupation of this wet tropical coast was undertaken and accomplished under the direction of the United Fruit Company, using Negro labor. More than half of all the acreage planted to bananas by this company in the Caribbean region is in Guatemala and Honduras. Until recently Honduras was by far the most important area, but the new plantings on the Pacific side of Guatemala now bring the acreage in that country almost even with the acreage in Honduras. The following table gives the acreages of banana plantations at the end of 1939:

United Fruit Company Banana Plantations*

Country	*Acres*
Honduras	35,818
Guatemala	34,530
Panamá	24,341
Colombia	8,475
Costa Rica	7,927
Jamaica	4,277
Others	4,453

In the coastal region of Honduras, as in these other banana regions of Caribbean America, the United Fruit Company has achieved the miracle of transforming a jungle into an area of important commercial production. The forest has been cleared, the wet lands have been drained, the settlements have been carefully arranged to guard against the perils of disease-carrying insects, and among the miles and miles of banana plantations railroad lines have been built to bring the fruit to the shipping ports.

The development of the banana lands required a larger supply of labor than could be furnished from the highlands of Honduras. As in other banana areas, the Company imported considerable numbers of Negroes, chiefly from Jamaica. The relatively dense population of the coastal region today is predominantly black; between these Negro plantation workers and the mestizos of the highlands there is almost no contact. Another world—a banana world—has been created on this previously unused portion of Honduras. From it Honduras derives financial profit through taxation but it cannot be considered to form a coherent part of the Honduran state.

For a time Honduras was threatened with a serious problem of unemployment in this region. A banana disease (*sigatoka*) threatened to wipe out most of the plantations not only in Honduras but elsewhere

* From the 1939 annual report of the Company.

along the coast of the Caribbean. The dense populations of Negroes were in danger of being left stranded without other source of employment. According to recent reports, however, a chemical spray has now been found which will probably bring the disease under control and save the Caribbean plantations.

HONDURAS AS A POLITICAL UNIT

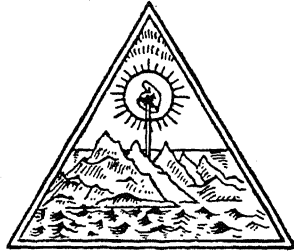
The foreign commerce of Honduras is dominated by the banana exports to the United States. In 1939 bananas accounted for 63 per cent of the value of all exports. Gold and silver, coffee, livestock, tobacco, and hides are the products of the highland communities. Coconuts, which occupied fourth place in the list of exports for 1938, come from the Caribbean coast. But these other exports are not nearly so important as bananas, nor do they bring in such large revenues to the government treasury. Of all the exports, 90 per cent in 1939 went to the United States. The United States, however, supplied only 65 per cent of the imports; Germany supplied 11 per cent, and Japan 6 per cent.

Why So Many Small Countries?

The question is frequently asked why so many small, independent countries came into existence in this part of Middle America. Why should Honduras have found it impossible to unite with El Salvador, Guatemala, or Nicaragua? In the colonial period, Honduras, like its neighbors, was administered from Guatemala City, but the several parts of this administrative area were never welded into a coherent unit at all comparable to the political coherence of the communities of central Mexico. In Central America the little clusters of people were too small, too much isolated from one another, and too diverse in composition and basic economy, to find a common sentiment in nationality. These different areas of concentrated settlement in Central America are not separated from one another by physical barriers any more difficult to cross than the physical barriers which separate Guadalajara, or Monterrey, or even Puebla from Mexico City. The isolation of the clusters of people in Central America is the result of the wide areas of empty country which separate them. There are simply not enough people to form an effective occupation, for the native Indians east of Guatemala were few, and the Spanish immigration after the first wave of conquest was a mere trickle.

As long as the clusters of people are separated into independent and generally hostile states, the building up of a sentiment of nationalism which is antagonistic to other states is not a difficult matter. Warfare for sentiment is much harder to combat than warfare for economic gain. Nowhere can the growth of this spirit of aggressive nationalism with its destructive results be more clearly observed than among the small independent states of Central America (255). In the last few decades, however, there has been less actual conflict, for the government of a country like Honduras is greatly strengthened, and the hold of the central authority stiffened, by the revenues from banana exports.

24

REPÚBLICA DE NICARAGUA

Total area, 57,143 square miles

Total population, 1,133,572

Capital city, Managua; population, 70,000

Trade per capita:

Imports: $8.02
Exports: $9.22

Unit of currency, cordoba ($1.69, gold content value)

Major commercial products in order of value:

coffee	hides and skins
bananas	sugar
gold	maize
cotton	dyewood
lumber	

Railroad mileage, 457

(The above statistics are for the year 1938.)

24

NICARAGUA

FOR A COUNTRY with no important urban manufacturing industries and no large amount of commercial activity, an unusually large proportion of the people of Nicaragua live in cities. Out of an estimated total population of more than 1,133,000, nearly 25 per cent are classed as urban. Two of the cities of Nicaragua are large—Managua, the capital, has about 70,000 inhabitants, and León, the second largest city, has a little over 50,000. In addition, Granada, the third city, has a population of more than 25,000. In the neighborhood of these three chief places there are many smaller towns (Map 124).

This concentration of people in cities and towns is both a cause and a result of political instability and of the insecurity of life in the rural districts. Unfortunately for the achievement of a coherent society, Nicaragua has been handicapped throughout its history by the strongly marked geographical separation of liberals and conservatives, and the continued and sometimes bitter rivalry between León and Granada, the strongholds of political action. León is the liberal center, the center of learning, the center of intense national feeling, a place where there are large numbers of lawyers, writers, teachers, and students. Granada is the center of wealth, the home of the planting aristocracy, the conservative center where people cling to the older values and customs. Managua, capital since 1858, was selected as a compromise between the two rivals. Sentiments of loyalty to the province, within the larger framework of loyalty to the country, have made the maintenance of domestic tran-

quillity in Nicaragua very difficult, and have led, on more than one occasion, to the request for outside assistance in the establishment of order.

The people of Nicaragua, like those of highland Honduras, are predominantly mestizo. Nicaragua was not densely populated by Indians at the time of the Spanish conquest, and for this reason there are almost no pure-blooded Indians left, and the proportion of white blood in the present population is high—much higher, for instance, than is the case in Guatemala. Along the Miskito Coast there are a few communities in which black people are in the majority; but the proportion of Negroes in the whole population of Nicaragua is not very great.

THE LAND

The territory which is now included in Nicaragua is divided physically into three major regions. The greater part of the country is made up of a triangular wedge of highland which is geologically related to the highland of Honduras (Maps 118 and 124). Along the eastern coast there is a wide belt of wet lowland—the Miskito Coast. The most important part of the country from the point of view of population and settlement is the third division—the Nicaraguan Lowland which extends from the Gulf of Fonseca diagonally across the isthmus, reaching the Caribbean along the border of Nicaragua and Costa Rica. The narrow belt of hilly land which separates part of this lowland from the Pacific and which is related structurally to the highlands of Costa Rica can be discussed as a part of the lowland region.

The northern highland of Nicaragua is composed, like that farther north, of folded and faulted structures with a predominantly east-west trend, buried on the Pacific side under a deep cover of volcanic material. The lava cliffs which border the Lempa Valley of El Salvador on the northeast, continue southeastward beyond the Gulf of Fonseca along the northeast side of the Nicaraguan Lowland. Elevations along the southwest edge of the highland are between 5,000 and 7,000 feet above the sea. The highland slopes gradually toward the east, and where the underlying crystalline formations are exposed at the surface there is a succession of long narrow finger-like ridges oriented east and west, and separated by deep lowland embayments.

The finger-like ridges of the northern highland of Nicaragua end some forty or fifty miles from the Caribbean coast. Between them and the Caribbean itself is a wide lowland, the largest area of plain south of Yucatán.

Both northern highland and eastern lowland are swept by the warm moist winds from the Caribbean. These steady easterly winds bring abundant rains to the Miskito Coast, and these rains support a luxuriant rain forest. There seems to be a belt of less rainfall (Map 111), however, some twenty or thirty miles back from the coast which is revealed by the presence of a drier type of vegetation cover—a semideciduous forest mixed with dry savanna. Where the easterly winds are forced to rise over the eastern slopes of the highlands, on the other hand, the rainfall is very heavy, in some places probably more than 200 inches a year. Here the cover of tropical rain forest is exceptionally thick. At the higher altitudes on the highland where rainfall is more moderate than on the lower east-facing slopes and where the temperatures are lower (tierra templada and tierra fría) the oak and pine forests characteristic of the highland of Honduras and Guatemala appear. On the northern highland of Nicaragua are the southernmost stands of North American species of pine. The vegetation of the tierra fría farther to the south includes none of these species.

The Nicaraguan Lowland

The Nicaraguan Lowland is a feature of major importance in the geography of Central America. It is formed by a long, narrow structural depression which runs diagonally across the isthmus from northwest to southeast. One end of the depression is at the northwesternmost extremity of the Lempa Valley in El Salvador, near the border of Guatemala; the other end is on the Caribbean, on the border of Nicaragua and Costa Rica. The depression has dropped farthest where it has been invaded and drowned by the Gulf of Fonseca.

Within the Nicaraguan part of the depression there are two large lakes, both draining to the Caribbean. Lake Managua is about 40 miles long, and its surface is 127 feet above sea level; Lake Nicaragua is 100 miles long by 45 miles wide, and its surface is only 106 feet above sea level. The Río San Juan drains Lake Nicaragua southeastward to the Caribbean, running along the border between Nicaragua and Costa Rica.

The northwestern end of the lowland in Nicaragua is the scene of intense volcanic activity. In Lake Nicaragua there are three volcanic cones rising to altitudes of about 5,000 feet. Between the volcano Momotombo on the western shore of Lake Managua and the volcano Coseguina which overlooks the entrance of the Gulf of Fonseca, there is a string of more than twenty cones. Many of these cones are still

active and earthquakes accompanied by deep falls of ash over the surrounding country are not infrequent occurrences. In 1931 the city of Managua was devastated by an earthquake and had to be almost entirely rebuilt. The volcanic ash provides a soil of more than average fertility for tropical crops.

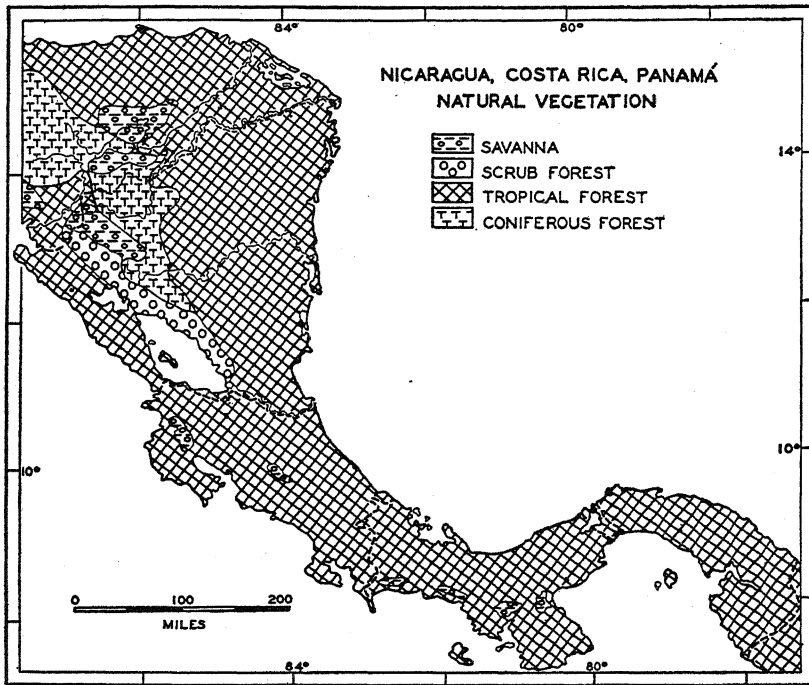
The rainfall in the Nicaraguan Lowland is heavy near the Caribbean, but is moderate to light in the northwestern section (Map 111). The heavy rains and the tropical rain forest extend along the San Juan Valley

Map 124

about as far as the shore of Lake Nicaragua. Since the rain-bearing winds come from the east, the driest part of the lowland is along the base of the northern highland, where a local "rain shadow" is formed on the southwest-facing lee slope. The northeast side of Lake Nicaragua and Lake Managua are relatively dry, and because of the high temperatures and rapid evaporation are not suitable for crops without irrigation. No large supplies of water are available for irrigation because the streams from the highlands mostly drain eastward, and the cost of pumping water up from the lakes would be prohibitive. This part of the lowland is covered only by a dry scrub forest. The southwestern side of the

lakes, on the other hand, receives a moderate rainfall, most of which comes during the summer rainy season.

THE PATTERN OF SETTLEMENT

The Nicaraguan Lowland was first plundered and then settled by expeditions sent out from Panamá. As early as 1519, exploring parties were moving northward from Panamá City, seeking for sources of pre-

MAP 125

cious metals or gems. In the Nicaraguan Lowland, along the southwestern shores of Lake Nicaragua, a moderately dense Indian population was discovered, practicing a shifting cultivation of maize and supplementing their diet with wild game and fish. These people proved to be peaceful, and were quickly converted to Christianity; in gratitude they loaded the strange newcomers with gold ornaments. This display of what the Spaniards thought was only a part of a great accumulation of such gold objects led the conquerors to believe that here, indeed, was a land worthy of their more careful attention. In 1524 another expedition from Panamá founded two colonies in what is now Nicaragua: one was

Granada, in the midst of the country well-peopled with friendly natives; the other was León, located at a site more easily accessible to the Pacific. But when the gold ornaments of the Indians had all been collected, and no other sources of gold were discovered, the Nicaraguan settlements languished, and the main course of Spanish conquest was directed elsewhere. In 1570 these colonies were placed under the administrative jurisdiction of Guatemala; and, unfortunately for the future peace of the region, León, rather than Granada, was chosen as the local administrative center.

Rivalry between the people of León and the people of Granada began in the sixteenth century. From the start, Granada was more wealthy. Because of the relative abundance of Indians, and the existence, on the shores of the lake, of lands well suited to agricultural development, the people of Granada were able to establish large estates and to make a profit from commercial crops. Around Granada they began to produce cacao, sugar cane, and indigo; in Granada they built their homes. But the district around León lacked a sufficient supply of Indian workers, and the settlers were too poor to import Negro slaves. León could barely produce enough of such crops as maize, rice, beans, and bananas to feed the population of the district. It was selected as administrative center because, no doubt, of its easier accessibility to the Pacific. If Granada had been made the political center—and it was the usual practice in Latin America to select the centers of wealth as the political centers — then the whole subsequent history of the Nicaraguan area would have been written in very different terms. Because the rivalry was permitted to grow, the establishment of order and coherence in the modern state of Nicaragua has proved to be extraordinarily difficult.

The Area of Concentrated Settlement in the Nicaraguan Lowland

Most of the population of Nicaragua is still concentrated in the triangular area between the western shore of Lake Nicaragua, the southwestern shore of Lake Managua, the southwestern side of the string of volcanoes between Momotombo and Coseguina, and the Pacific coast (Map 127). The new city of Managua, built in 1858 and rebuilt after the disaster of 1931, has become the capital; but León and Granada still continue to operate as the poles of political thought. León has still a relatively small rural population around it; and Granada is still the center of agricultural production. Throughout the area of concentrated settlement large properties and small ones are mixed. The leading crop in

terms of acreage is maize, which is used mostly for local subsistence. Of the commercial crops, by far the most important in the modern period is coffee—coffee which is raised mostly on the hilly land west of Granada (Maps 124 and 126). Other commercial crops include cotton, sugar cane, and tobacco.

The Settlement of the Outlying Parts of Nicaragua

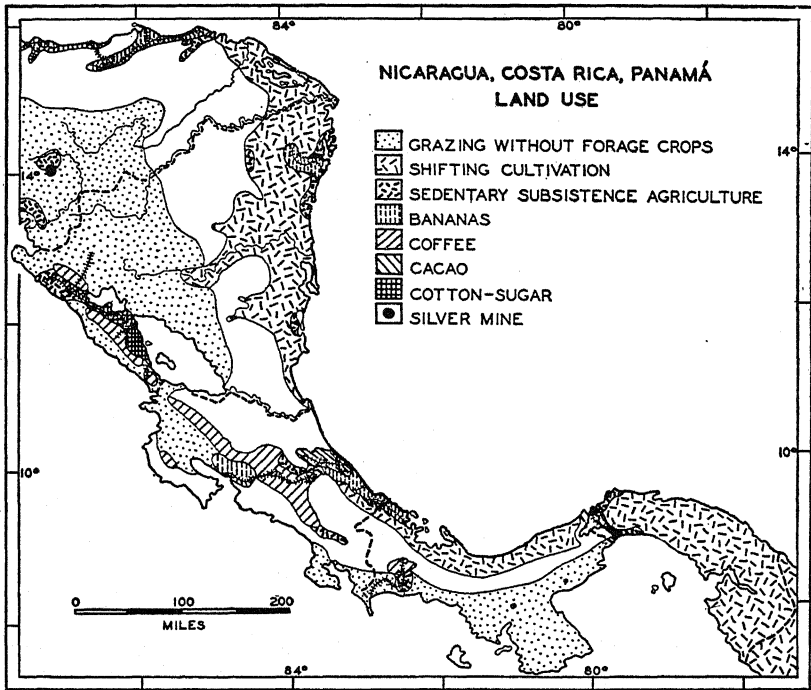
The outlying parts of Nicaragua are only very sparsely occupied. The nucleus of population just described has never shown any tendency to expand or to send out colonies; although most of the Nicaraguans live in the tierra caliente, they have never tried to establish even temporary rainy-season homes in the cooler highlands. Most of the highland remains empty, except for a belt of cattle ranches along the westernmost edge. On some of these ranches there has been a small amount of coffee planting in the last few decades, but the spread of agriculture is slow. Although land is cheap in Nicaragua, the roads are so poor outside of the central area that transportation to a market is very costly. There are times, also, when lawlessness reaches such a degree that the rural settler must flee to the towns for protection.

In northern Nicaragua and southern Honduras, some of the stream gravels of the highland contain small quantities of gold. Every now and then a strike is reported and people on both sides of the border flock to the place, eager for a chance to become wealthy. Later, disappointed, the people who make up these temporary communities slip away again.

The rainy Caribbean coast of Nicaragua was long neglected by the Spaniards as a region of settlement. The sparse population of Indians, the dense forest, and the ravages of disease effectively turned the Spaniards away from this region.

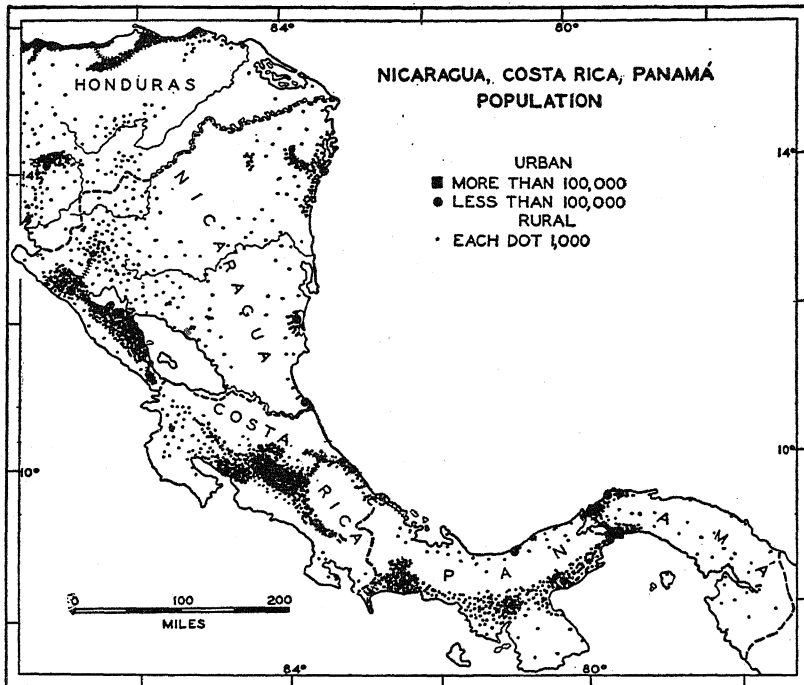
The whole Caribbean coast from Yucatán to Panamá was almost unoccupied by Europeans, therefore, when the English pirates, seeking bases for their attacks on Spanish shipping, established the first settlements. In 1678 the governor of Jamaica set up a protectorate over the Miskito Indians, and in 1740 several colonies of Jamaica Negroes were placed in what is now eastern Nicaragua. The two most important colonies were at Bluefields and Greytown (now renamed San Juan del Norte). Eventually the British recognized Spanish sovereignty along all of the Caribbean coast except only the eastern side of the Yucatán Peninsula, where British Honduras still remains a British possession.

In the last three decades new settlements have been established along

the Caribbean coast of Nicaragua. A North American company has developed, inland from Puerto Cabezas, one of its minor areas of banana plantations; and here, as in Honduras and Guatemala, the population of workers was brought from Jamaica. Other foreign companies have established plantations at several places along the coast. The chief commercial products are bananas and cacao.

Map 126

NICARAGUA AS A POLITICAL UNIT

Nicaragua is a poor country. Its foreign commerce is the smallest in terms of value of all the countries of Latin America. Its government has been repeatedly weakened by lack of revenue to the point where the maintenance of order, even in the area of concentrated settlement, has become impossible. Nicaragua offers an excellent opportunity for a study of the question: Is poverty a result of small population, or is small population a result of poverty? Certainly the two have been interactive; and both poverty and the lack of expanding rural settlement are augmented by the tendency of the Nicaraguans to concentrate in cities and towns.

Coffee is usually the leading export in terms of value. About a century ago coffee replaced cacao as the leading product of the country, and cacao today has almost entirely disappeared from the list of exports. In 1939, because of unusual activity in the placer mining, gold jumped temporarily into the leading place, amounting to 42 per cent while coffee was reduced to only 32 per cent. Normally, however, coffee stands far

MAP 127

in the lead. Bananas are usually the second item in the list, but in 1939 amounted to only 7 per cent of the total. Other exports include cotton, dyewood and cabinet wood, cattle products, sugar, and maize. Of the exports in 1939, 77 per cent went to the United States, and 10 per cent to Germany. The United States supplied 68 per cent of the imports, and Germany supplied 12 per cent.

Poverty is reflected in the weakness of the central government, for political revolts are easily arranged when a government is financially embarrassed and unable to pay its army. Except for a period from 1863 to 1893, during which the conservatives were able to hold the reins of power firmly, the country has been torn again and again by internal con-

flicts. On several occasions one side or the other has appealed to outside interests for aid in maintaining order. In 1912, invited by the group then in office, the United States marines were sent to Nicaragua, and except for a short interval in 1925–26, they remained in that country until 1933. In the effort to enforce peace they met with much resistance especially from guerilla bands who were able easily to escape into the highlands. Much resentment was expressed throughout Latin America for what was commonly considered to be interference in a purely domestic problem.

Perhaps Nicaragua's chief potential source of revenue is the proposed canal. As an alternative passage across the isthmus, the Nicaraguan route has long been considered. The United States has already paid a substantial sum to the Nicaraguan government for the exclusive right to build such a canal, and for the leasing of the territory necessary to operate and defend it. The treaty made with Nicaragua has been protested by neighboring Central American states, chiefly Costa Rica, whose rights and interests are also involved. Eventually, however, a second canal may actually be built along the valley of the San Juan to Lake Nicaragua, and through a cut in the hilly border which separates the southwestern end of Lake Nicaragua from the Pacific. The beginning of construction and the subsequent operation of this canal would bring a greatly increased revenue to the Nicaraguan government and would undoubtedly make the solution of the internal weakness of the country a much simpler matter.

25

REPÚBLICA DE COSTA RICA

Total area, 23,000 square miles

Total population, 639,197

Capital city, San José; population, 78,883

Trade per capita:

Imports: $20.81
Exports: $16.73

Unit of currency, colon ($.787, gold content value)

Major commercial products in order of value:

coffee	lumber
bananas	honey
cacao	tuna fish
gold	hides and skins
mineral earths	

Railroad mileage, 413

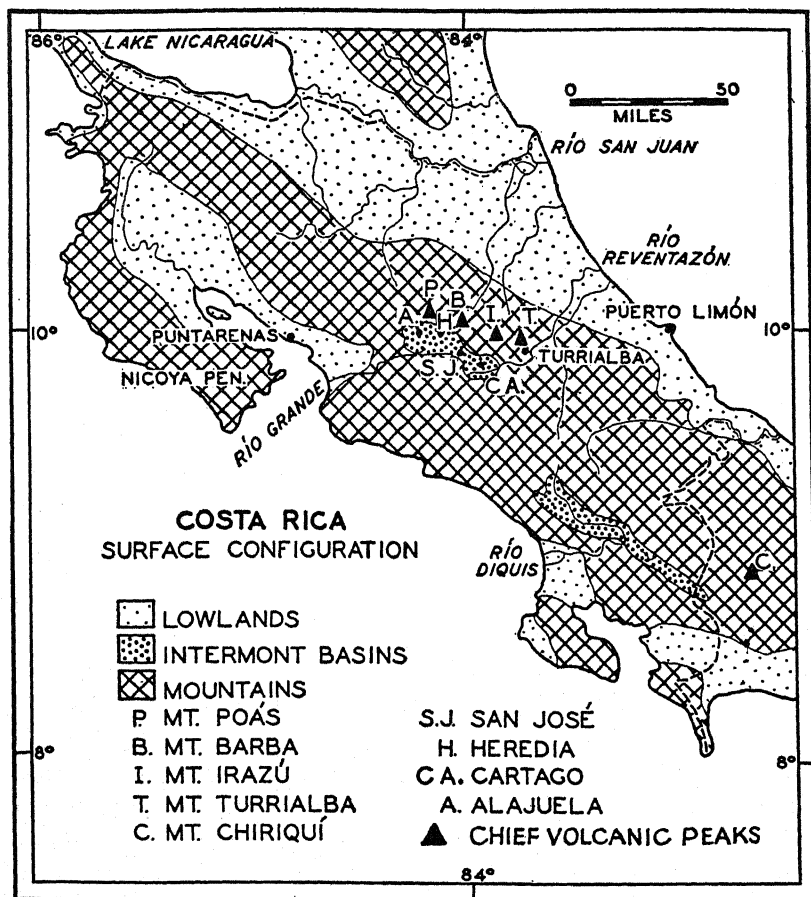
(The above statistics are for the year 1938.)

But Costa Rica, also, has its contrasts—its elements of diversity. Very different from the nearly pure white settlers of the highlands are the settlers of the lowland regions on either side of the isthmus. On the Pacific side the people of Costa Rica are not very different from those of Nicaragua: about half are of white ancestry and nearly half have some Indian blood. On the Caribbean side, more than half are Negro. The system of small farms operated by the owners is mostly, but not exclusively, a characteristic of the highlands: on the Pacific side there are large estates, a landed aristocracy, and hired workers; on the Caribbean side are the plantations of North American fruit companies, with field hands brought in from Jamaica. These contrasts, however, are of subordinate importance in the Costa Rican state taken as a whole. There are a little more than 600,000 inhabitants in Costa Rica, and of these about 76 per cent occupy the highland nucleus.

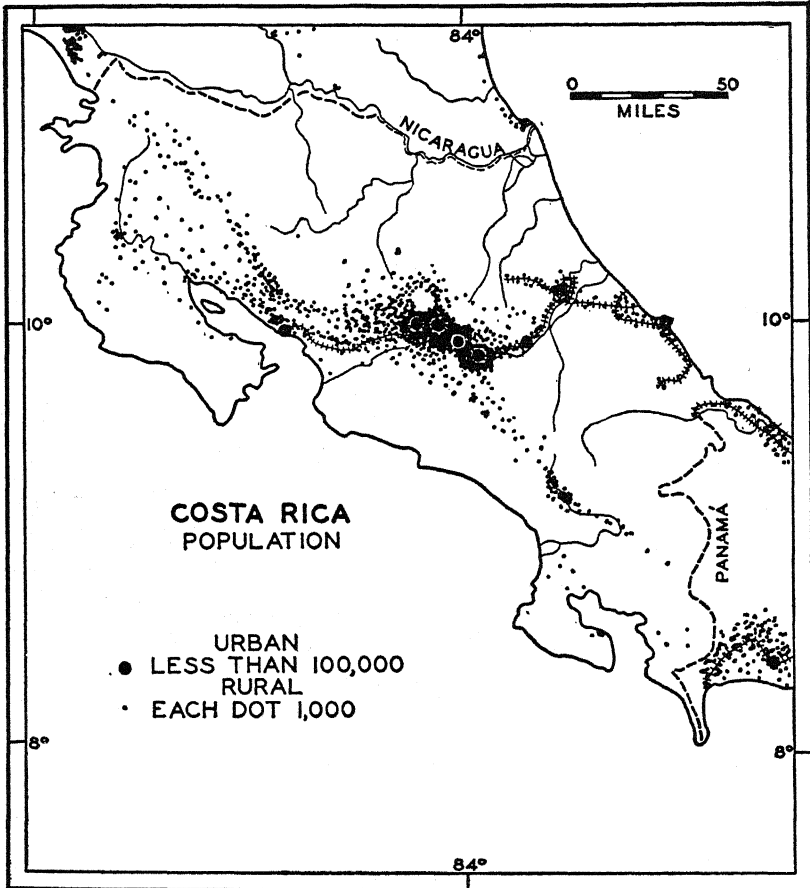
THE LAND

Costa Rica is almost as simple as El Salvador in the arrangement of its physical features, but the contrasts observable in its three parts are greater (Maps 124 and 128). The backbone of the isthmus in Costa Rica is made up of a chain of highlands extending from northwest to southeast. In the southern part of the country this mountainous backbone is higher than in the northern part. South of San José and Cartago, the two chief cities of the central area, the highest peaks reach elevations of more than 12,000 feet above the sea. The streams dissecting the highland area have cut deep and generally narrow canyons, leaving only a few spots of relatively gentle slopes. In the midst of the highland, however, are certain structural depressions, of which the largest is drained by the Río Diquis. This lowland depression is deep and wide; it lies parallel to the axis of the highlands. Where the river turns at right angles to pass through a narrow gorge on its way to the sea (Map 128), the valley bottom is only 600 feet above sea level. North of San José the backbone of the highlands descends gradually, until, in Nicaragua, it forms only a hilly belt between Lake Nicaragua and the Pacific.

In the central part of Costa Rica, just northeast of San José and Cartago, four great volcanic cones stand in a row, their bases merged into one massive volcanic pedestal. From northwest to southeast they are named Poás (9,120 ft.), Barba (9,280 ft.), Irazú (11,320 ft.), and Turrialba (11,220 ft.). This commanding line of volcanoes stands parallel to the main crest of the mountain backbone, but about twenty miles to

the northeast of it. Nestled between the steep slopes of the main cordillera on the southwest and the long gentle lower slopes of the volcanoes on the northeast is a high intermont basin, the *Meseta Central*, between 3,000 and 4,000 feet above sea level. This intermont basin is not a simple one; it is a structural depression, deeply filled with volcanic ash,

MAP 128

and now dissected by the headwaters of two rivers so that its surface is distinctly hilly. The southeastern part of the Meseta Central is drained by the headwaters of the Río Reventazón, which flows eastward through a deep valley and emerges on the Caribbean coast, north of Puerto Limón. The northwestern part of the Meseta Central is drained by the headwaters of the Río Grande, which enters the Pacific a little southeast of Puntarenas.

The lower country along the Pacific coast is composed of patches of plain fringing the water, or lying between the base of the highland and outlying block mountains. In northern Costa Rica there is a wide area of lowland at the head of the Gulf of Nicoya (on which Puntarenas is situated). Between this lowland and the Pacific is the Nicoya Peninsula,

MAP 129

on which a separate mountain block reaches elevations of more than 3,000 feet. A narrow fringe of plain borders the Gulf of Nicoya, but is cut off southeast of the gulf by the slopes of the highlands. The Río Diquis emerges from the highlands onto a swampy lowland in southern Costa Rica—a lowland which, like the one farther north, is bordered by detached mountain blocks and is partly invaded by the sea.

The lowlands on the Caribbean side are much simpler in their outlines.

The northeastern part of Costa Rica includes the end of the Nicaraguan Lowland which extends along the base of the highlands southeastward as far as Limón. Much of this land, especially near the coast, is swampy. Southeast of Limón the highlands are separated from the edge of the water by a narrow border of swampy plain.

The climatic conditions and the cover of vegetation are diversified by altitude and by the contrast between the wet Caribbean side and the drier Pacific side of the isthmus (Maps 110 and 111). The vegetation of the Caribbean Lowland is a dense rain forest which climbs well up the eastern slopes; the vegetation of the Pacific side is a deciduous forest with patches of savanna (Map 125). Waibel shows that the altitude limits of the types of vegetation differ on the two sides of the highlands—each altitude limit being higher on the wet eastern side than on the dry western side. He gives the altitude limits of the vertical zones for Costa Rica as follows:

VERTICAL ZONES OF COSTA RICA*

Zone	ALTITUDE IN FEET	
	Caribbean side	*Pacific side*
Tierra fría	above 5,900	above 4,900
Tierra templada	2,100–5,900	1,475–4,900
Tierra caliente	under 2,100	under 1,475

THE PATTERN OF SETTLEMENT

The Spaniards found no such tribes of peaceful natives in Costa Rica as they found farther north on the shores of Lake Nicaragua. A settlement was actually attempted on the Nicoya Peninsula as early as 1522, but it was soon abandoned because of the hostility of the Indians. Only after the more accessible parts of the isthmus had been ransacked, did the Spaniards give consideration to the high basin of Costa Rica, where they had found a small group of sedentary agricultural Indians—perhaps not more than seven or eight thousand in all. Shortly after 1560 the town of Cartago was founded and the Spanish occupation of the Meseta Central began.

Settlement in the Highlands

In the colonial period Costa Rica was even poorer than Nicaragua. The Indians of the Meseta Central proved of little value as workers and

* After Waibel, 264.

were soon almost completely annihilated by the new diseases. Without Indian workers there was no chance of producing sugar or indigo. Only by the hacienda system could a profit be made in such remote places as the Meseta Central; and without Indian labor there could be no hacienda system. By 1572 the fifty-five Spanish families that had settled in and around Cartago had to make a painful decision: either they would have to work their own fields and produce their own subsistence crops, or they would have to face starvation. In many other parts of Spanish America the early settlers had to make a similar decision—but only in Costa Rica did they turn to agriculture, and form a peasant society of small farmers. Whether this remarkable decision was due to certain racial or cultural peculiarities not recorded in the histories, or to the leadership of certain individuals, or to the isolation of the highland basins which made retreat to other more habitable areas impossible, or to other causes, remains unknown. It is clear, however, that this group of colonists in Costa Rica did actually abandon the idea of the hacienda—exploited labor and a landed aristocracy. They formed a democracy of small farmers, each working his own land; and the population remained pure Spanish, with a very small amount of Indian mixture.

Expansion of Settlement

The first signs of settlement expansion appeared early in the eighteenth century, while Costa Rica was still a poor country. In 1736, pioneers from Cartago moved into that part of the Meseta Central which drains to the Pacific and established there the town of San José. Still the movement did not involve any very large numbers, for in 1751 this central area was reported to include only 2,330 people, in 399 families. Nevertheless, expansion continued, and in 1790 another town (Alajuela) was founded not far from San José, and a little later a fourth town (Heredia), also in the vicinity of San José. To what extent these movements of the eighteenth century were the result of population pressure around Cartago it is difficult to estimate. It is true that Cartago has a climate which is far less comfortable than that of the area around San José, for the heavy clouds and excessive rains of the eastern slopes spill over into the Meseta Central through the gap of the Reventazón Valley, while San José is to a certain extent protected by the volcanoes. Alajuela and Heredia are said to be especially favored in terms of sunshine and mild temperatures. The movement of expansion, however, did not result in any serious or permanent decline in the density of settlement around the original nucleus of Cartago.

Costa Rica was still a poor country when it was granted independence from Spain. As in other Latin-American countries, the game of domestic politics absorbed the abilities of, and paid its rewards to, only a small group of leading families. San José became the seat of government; and for a time there was a separation and even armed conflict between the liberals in the capital and the conservatives in Cartago—a situation which reminds one strongly of that in Nicaragua. Costa Rica, at the time of independence, had little to distinguish it; there were no minerals of importance, no wealthy planters. Yet even at that time this little highland community was unique in Latin America. In 1821 there were some 60,000 people in the country, most of them in the Meseta Central; the population density around Cartago was about 260 people per square mile —one of the greatest densities to be found in all of mainland Latin America. This was also one of the very few spots where farming was being practiced by small owners of Spanish ancestry, and where large landed properties were the exception rather than the rule.

The Spread of Coffee Planting

The first country in Central America to take up the cultivation of coffee was Costa Rica. The plant was probably introduced into this region as early as 1796, but not until 1825 was the first small shipment made to foreign countries. When in the early 1820's Costa Rica found itself independent of Spain, its government realized the very great importance of getting some kind of money crop—some kind of product to export and to tax. The Costa Ricans were the first in this part of Latin America to realize the advantages for coffee growing which are to be found in certain parts of the tierra templada, especially those parts which have a dry season and a porous volcanic soil. The coffee produced in such places, especially the coffee which comes from close to the upper limits, is now recognized as possessing a superior flavor. At an early date the Costa Rican government sought to stimulate this form of commercial production by offering free land to any one who would agree to set out coffee trees. The government also began the construction of cart roads both to Limón and to Puntarenas.

The result was a "coffee rush." In 1825 the first few bags were sent out, and in 1829 coffee became the chief export product of the country. Until the cart road to Puntarenas was completed in 1846, transportation had to be by muleback, and no very important volume of coffee could be moved. At first the chief market was in the west coast countries of South America, but when the first bags were sent to Great Britain in 1845

the European market was at last opened to the Costa Rican product. Coffee export on a large scale began about the middle of the century; since the opening of the railroad to Puerto Limón in 1891, that port has become the chief outlet.

Settlement expansion after the middle of the last century went on more and more rapidly. One result of the new economic prosperity was an increase in the birth rate. With population growing at an ever increasing rate, and with the government adopting a policy of giving free land for new coffee plantations, continued pioneer expansion went on around the margins of the original settlements, yet without any accompanying decrease in the density of population in the older settled areas. Pioneers spread first down the valley of the Río Reventazón, their new settlements now extending as far as the old mission settlement of Turrialba, just under 2,000 feet in altitude. In the canton of Turrialba there were, in 1883, only 1,068 people; but this number had increased to 21,000 by 1936. New settlement also moved up the slopes of the volcanoes—a movement which has now gone beyond the upper limits of coffee. On Irazú, at an altitude of about 9,800 feet, there are settlers who pasture dairy cattle and cultivate potatoes (Map 128). Over a pass between Barba and Poás settlement has extended to the northeastern slopes of the volcanoes. Another current of settlement has gone to the west of Poás, now almost completely encircling its base. Pioneers have also advanced down the railroad line which connects San José and Puntarenas; and since 1910 there has been a movement northwestward from this line along the Pacific slope of the highlands. The latest movement has been directed toward the south, and pioneer settlers are now filling the upper parts of the Diquis Valley.

All these zones of pioneer expansion are closely connected to the original nucleus in the Meseta Central. An extensive network of motor roads has been built around San José and Cartago, with highways leading out toward the new zones of settlement; even the more remote places can be reached by wagon roads. None of the settlements has been forced, through difficulty of access to a market, to develop a self-sufficient economy. According to Waibel (264) there is still a considerable area of land suited to pioneer settlement into which the advance can be continued.

Settlement in the Pacific Coastal Region

The settlement of the Pacific Coastal Region of Costa Rica shares none of the unique character of the highland settlements. In many

respects the system of land tenure and the forms of land use more nearly resemble those of Nicaragua than those of the Costa Rican highland. When Costa Rica became independent from Spain, the Nicoya Peninsula and the lowlands at the head of the Gulf of Nicoya were scantily occupied by a pastoral people, and were divided into large private properties, most of them owned by a minority of pure-blooded Spaniards. The majority of the people were mestizos, very similar in appearance to those of Nicaragua. The census of 1844 counted only 5,193 rural inhabitants of the coastal region, with another 833 in the port of Puntarenas.

Population in this region during the present century has increased at a rate greater than that of the country as a whole; yet this has led to little expansion of the settled area. In 1936, this region had 104,361 inhabitants. The increase has been absorbed by a decrease in the size of the cattle estates, and by the establishment of new agricultural settlements in a few small areas—notably the new coffee plantations on the mountains of the Nicoya Peninsula, and the new banana plantations along the shore near Puntarenas. The region as a whole is still one of relatively low density.

The economy of the Pacific Coastal Region has one important characteristic which distinguishes it from the economy of lowland Nicaragua—it is closely tied to an economically vigorous and geographically expanding area of concentrated settlement in the highland. Although few products of the lowlands enter into the foreign trade of Costa Rica, the lowland products are of great importance in the domestic trade. The chief lowland product is cattle. The animals are driven on the hoof to the highland markets, where they provide an essential part of the food supply of the highland farmers and city dwellers. The steady expansion of this market brings increasing prosperity to the ranchers of the lowlands.

Settlement of the Caribbean Coast

Entirely different has been the course of settlement in the Caribbean lowland of Costa Rica. The greater part of the eastern lowland remains even now almost unoccupied—especially the whole northern part along the border of Nicaragua. But in the vicinity of Limón, settlement began in 1878 with the first of the banana plantations developed by foreign capital. The North American promoter, Minor C. Keith, was engaged in the construction of the railroad from Limón to San José, which climbed to the highlands by way of the Reventazón Valley. Wishing to provide

the new railroad with paying traffic along its lower course, he undertook the establishment of banana plantations and the shipment of bananas to New Orleans. To carry on the hard work of clearing the forest, planting and harvesting the bananas, and transporting them to the docks at Puerto Limón, large numbers of Jamaica Negroes were brought in. This was the first part of the Caribbean coast of Central America to be utilized for plantations of bananas for the North American trade.

Banana planting in this region followed a course similar to that followed some decades later by Honduras. In 1909 Costa Rica was the leading producer, and its exports increased steadily until, in 1913, the bunches shipped out numbered 11,000,000. But then the spread of a banana disease so greatly reduced the yield that the whole economy of the coastal region was threatened. In 1933 only 4,341,000 bunches were shipped from Costa Rica—the same number as in 1902. The dense Negro population was stranded without support as the United Fruit Company shifted its operations elsewhere—partly northward to Honduras and Guatemala, and partly to the Pacific side of Costa Rica where Negro labor is not used. A proposal to return the unemployed Negroes of the Caribbean lowland to Jamaica was not enthusiastically received in that densely populated island. Costa Rica was left with a serious population minority problem on its hands.

At present, the predominantly black population of the Caribbean region is supported by two chief activities. Most of the people have become subsistence farmers—and among the peoples of Middle America there are no more successful subsistence farmers than the Negroes. In recent years there has been a considerable increase in cacao planting, an industry for which the region is well suited. A fairly large reservoir of effective workers is available in this part of Costa Rica which might bring success in other forms of tropical commercial agriculture.

COSTA RICA AS A POLITICAL UNIT

Costa Rica, then, is actually made up of three strongly contrasted parts, each different from the others in population density, in racial composition, in land tenure and economy, and in the tendency to expand the area of settlement. The proportion of the people of Costa Rica who live in the highland has been gradually decreasing because of the increase of population in the lowlands on either side. The following table shows how these proportions have shifted during the last fifty years (Waibel, 264):

PROPORTION OF POPULATION IN THE THREE REGIONS OF COSTA RICA

Region	*1892*	*1916*	*1936*
The Highlands	83.6	80.2	76.5
The Caribbean Lowlands	3.1	5.4	5.9
The Pacific Coastal Region	13.3	14.4	17.6
Total population	243,205	441,342	591,862

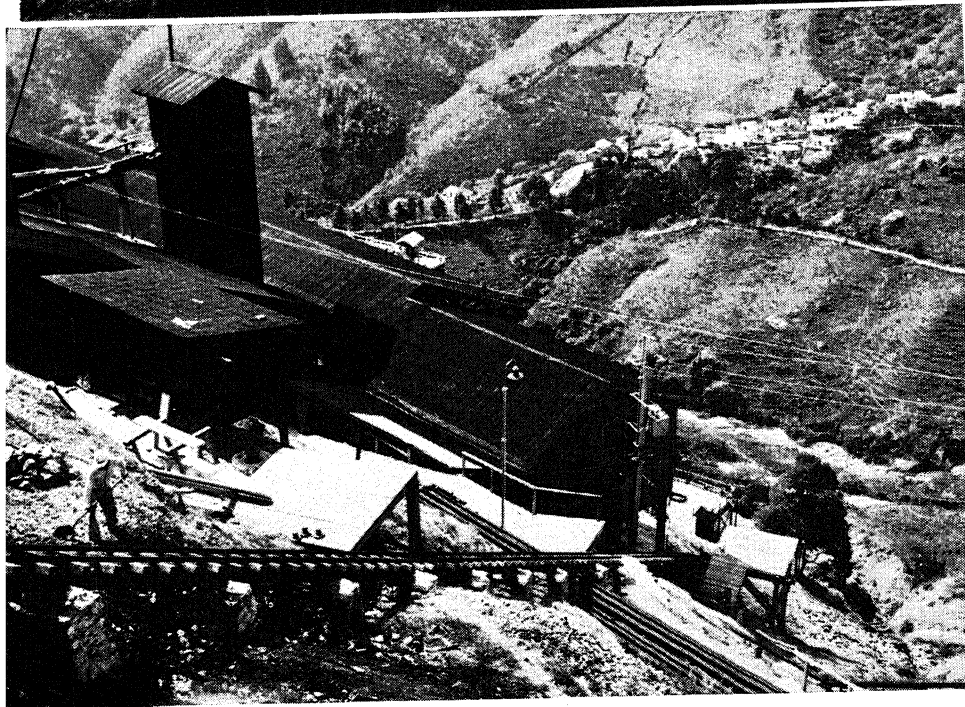
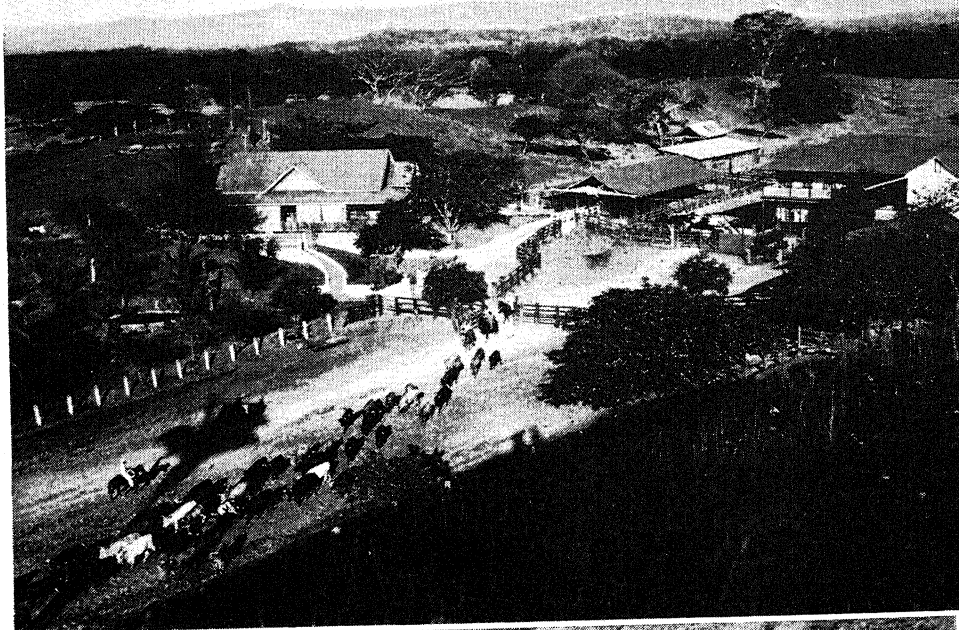
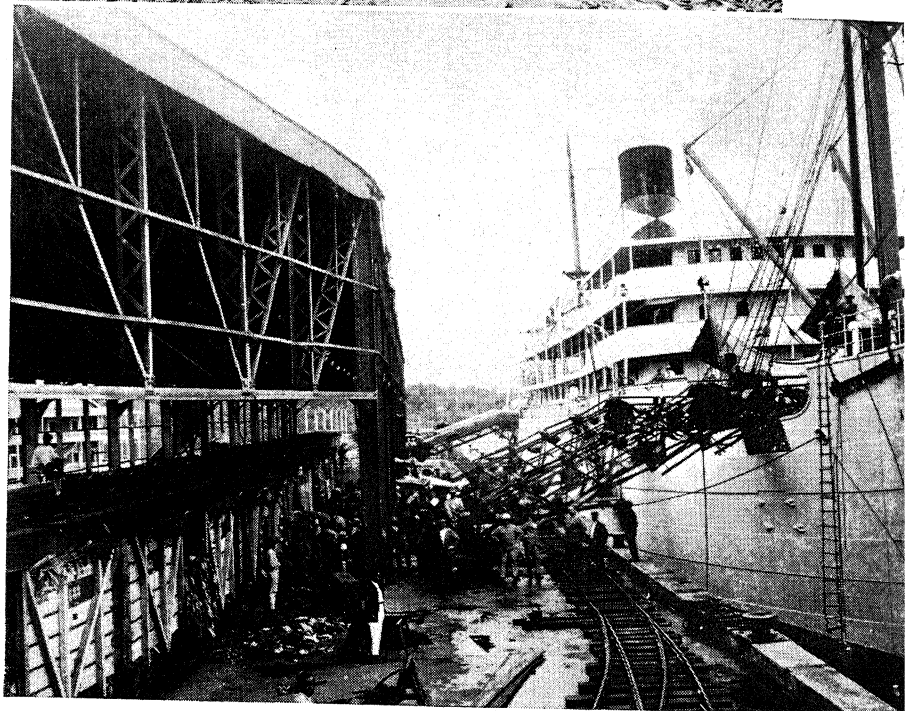
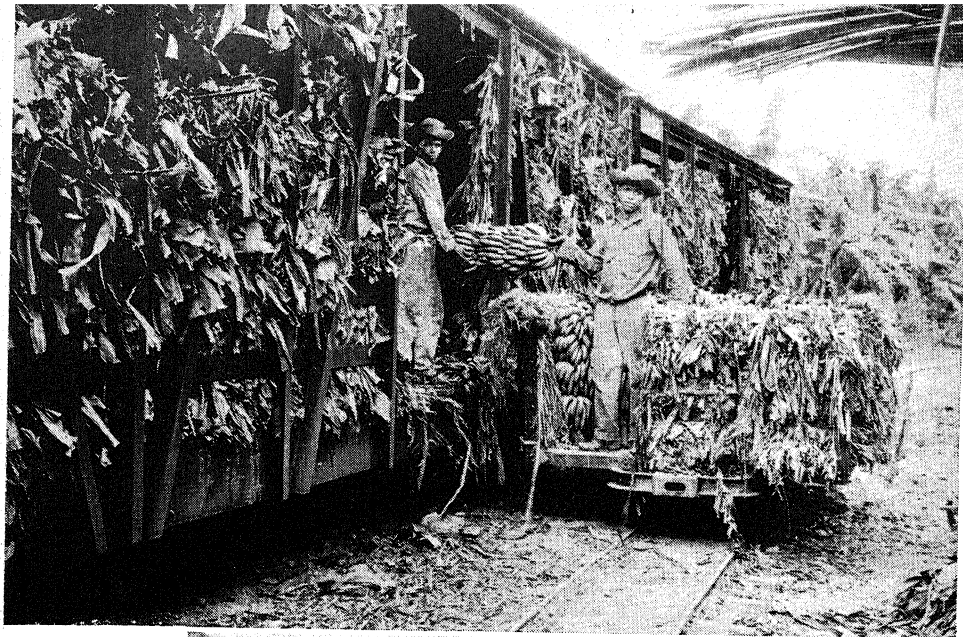
The contrasted racial composition of the people of Costa Rica in these three regions is indicated by figures for 1927, which would not be significantly altered if they were compiled for the present time (Waibel, 264):

RACIAL PROPORTIONS IN THE THREE REGIONS OF COSTA RICA IN 1927

Race	*The Highlands*	*The Caribbean Lowlands*	*The Pacific Coastal Region*
White	91.0	34.4	50.1
Mestizo	8.0	3.3	45.9
Indian	0.5	3.3	1.6
Negro	0.2	55.7	0.5
Others	0.3	3.3	1.9

Foreign Trade of Costa Rica

The profits, and also the losses, of foreign commerce are spread more widely among the people of Costa Rica than is common in the countries of Latin America. The figures of per capita trade in this country have more real meaning in terms of the prosperity of the people than in many other states. The leading export is coffee, and this comes almost exclusively from the small plantations of the highlands. In 1939 coffee made up 51 per cent of the value of all exports; bananas made up 21 per cent, and cacao 13 per cent. In 1938 Costa Rica exported 2 per cent of the coffee of Latin America, 10 per cent of the bananas, and 4 per cent of the cacao.

Costa Rica is another of the countries of Latin America which does most of its foreign business with the United States. In 1939 the United States absorbed 45 per cent of the exports and supplied 58 per cent of the imports. In that year Germany and Great Britain took 25 per cent and 17 per cent, respectively, of the exports; but Germany sent 17 per cent of the imports whereas Great Britain sent only 4 per cent. Even Japan was ahead of Great Britain, supplying 5 per cent of the imports.

The cattle estate pictured above — pleasant in its surroundings and apparent prosperous — is in the lowlands of Costa Rica at the head of the Gulf of Nicoy In the distance can be seen the highland of Costa Rica, where expanding settl ments of predominantly white coffee planters are located. (Courtesy of tl Junta Nacional de Turismo de Costa Rica.) The lower picture shows the buil ings of a silver mine in Honduras, with a small village visible in the valley beyon (Courtesy of Pan American Airways.)

Bananas must be rushed from farm to market on a carefully planned schedule, for they ripen quickly and any delay in transit to the port, on the docks, or at sea may result in heavy loss. Above is a scene in Honduras. The tramcar has brought the fruit from the farm and it is being loaded into the waiting railway car for shipment to a port. Below is a scene at Puerto Limón in Costa Rica, where special loading devices make possible delivery to the ship of 85,000 bunches in from twelve to fifteen hours. (Both photos, courtesy of the United Fruit Company.)

The Coherent National Life

Costa Rica, like Colombia, has been able to make use of its contrasted regions as a source of strength; it is one of the few countries in Latin America which have been able to develop a strongly coherent national life. To a smaller degree than in most of the other countries has the political and economic power been concentrated in the hands of a very few. For this reason Costa Rica is an example of an effective democracy; it can boast one of the smallest percentages of illiteracy in all Latin America.

The region of concentrated settlement in the highland forms the nucleus around which the Costa Rican state is organized. This is the region which merits the careful attention of students of population in Latin America. Here the density of population is sufficient to pay the costs of road construction, of building and operating schools, and of other public services. Here is a notable example of what can be done under the monotonous weather conditions of a tropical land. Here is a region of expanding pioneer settlements, of people vigorously at work transforming empty country into a country of farms and permanent homes. If there were more regions like this in Latin America, so much of the land would not be empty and so many of the small rural communities would not remain permanently in isolation. To identify the factors peculiar to Costa Rica which have produced these unusual results is a problem of major significance demanding future study.

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REPÚBLICA DE PANAMÁ

Total area, 34,169 square miles

Total population, 573,351

Capital city, Panamá; population, 82,827

Trade per capita:

Imports: $32.24
Exports: $14.01

Unit of currency, balboa ($1.00, gold content value)

Major commercial products in order of value:

bananas	hides
cacao	mother-of-pearl
gold	coffee
coconuts	rubber
meats	

Railroad mileage, 98

(The above statistics are for the year 1938.)

26

PANAMÁ

THE HISTORICAL BACKGROUND of Panamá is different from that of any other Central American state. Until 1903 it was an outlying part of Colombia; its present status as an independent political unit under the protection of the United States was achieved principally as a result of the strategic importance of its position on one of the world's major pass routes. Since Balboa first revealed the geographical nature of the isthmus in 1513, the story of man in Panamá has been one concerned with passage rather than with settlement. At one time or another all the great maritime nations of the world have coveted this little strip of territory, and the forces which have shaped the larger communities on either side of the isthmus are international rather than local. Panamá, the present-day state, differs from all the other Latin-American states in that it possesses no central area of concentrated settlement focusing on an urban core. The nucleus of the state is the city of Panamá. But Panamá, the city, is not a product of Panamá, the country. It came into existence, and its importance has been maintained, because it controls a pass route. Meanwhile the three small clusters of people along the Pacific coast west of Panama City are distinctly minor ones on the map of Middle America (Map 144). The greater part of the territory of Panamá remains almost unoccupied.

The population of Panamá is smaller than that of any other independent state of Latin America. Recently the number of inhabitants was estimated as a little more than 500,000. Furthermore, the rate of increase is

very slow—between 20,000 and 25,000 each decade from 1920 to 1940. A quarter of all the people of Panamá live in the capital city, which now has a population of about 127,600; and another 66,400 live in Colón, on the Caribbean side of the pass route. As one might expect, the racial composition of the population is highly diverse, for people from all parts of the world are drawn together at the Canal; but outside of the cities of Panamá and Colón, the small population of western Panamá is very similar to that of the Pacific Coast of Costa Rica and Nicaragua—chiefly mestizo with a small group of landowners of pure or nearly pure Spanish descent.

THE LAND

The Isthmus of Panamá is a narrow curving strip of land varying in width from about 30 miles to about 120 (Map 124). Its outlines do not correspond to the trend of its geologic structures, for the two mountain chains which form its backbone both run in general from northwest to southeast. In the west the range which forms the backbone of Costa Rica continues into Panamá; near the border this range is surmounted by several volcanic cones, the highest and most imposing of which is Mt. Chiriquí—a little over 11,000 feet in altitude. The main range continues southeastward as a narrow, steep-sided ridge about 3,000 feet in altitude until it comes to an abrupt ending just northeast of Anton and southwest of Panama City. The second mountain system begins east of Colón and runs southwestward for a short distance into Colombia—this is the San Blas Range, the highest summits of which reach 3,000 feet. In addition to these two ranges which form the backbone of the isthmus, a third range appears in southeastern Panamá, bordering the Pacific, and this range continues southward along the Pacific Coast of Colombia, where it is known as the Serranía de Baudó.

There is a gap, however, between the end of the eastern range and that of the western range—a gap in which the cutting of the streams has produced a terrain of steep slopes and rounded hills, but which offers a passage from one ocean to the other with a climb of no more than 285 feet. Because of the offset position of the two ranges the narrow strip of land which connects them, only 42 miles wide, runs from southwest to northeast. This produces the oft-remarked peculiarity that to reach the Pacific from the Caribbean one must travel toward the east.

Along the whole length of the Isthmus of Panamá there is a great contrast between the two sides (Maps 110 and 111). The Caribbean coast

is very rainy, receiving in many places more than 150 inches a year, concentrated in a season of excessively heavy rains between May and December. At Colón the average annual rainfall is 127.9 inches. Such heavy rainfall in a land where the temperatures average nearly 80° results in the very deep decomposition of the rock and in the growth of a luxuriant cover of tropical rain forest. At the crest of the backbone ranges, however, the amount of moisture diminishes, and on the Pacific side of the isthmus it is distinctly less, although at no place is it deficient. At Balboa Heights (Panama City) the average rainfall is 68.6 inches, distributed in a rainy season and a season of less rain as along the Caribbean coast. The result is that the dense evergreen forest of the wetter side changes to a semideciduous forest on the drier side; and on some of the lowland plains along the Pacific there are patches of savanna which interrupt the forest. The Spanish settlement went chiefly to these savannas, for not only was the Spaniard a lover of open country, but also few parts of the world were so unhealthful, because of disease-carrying insects, as the Caribbean lowlands south of Yucatán.

Along both sides of the isthmus there are many deep bays providing protected anchorages. Especially important is the shallow Gulf of Panamá which forms the separation between the ranges of western Panamá and the beginning of the Serranía de Baudó of Colombia. On the Caribbean side near the opening between the ranges there are several small harbors, especially along the coast northeast of Colón. It is interesting to note that the problem of effecting a landing differs considerably on the Caribbean and on the Pacific, for the tide on the Caribbean shore amounts to no more than 27 inches, whereas the tide on the Gulf of Panamá is 21 feet.

PASSAGE ACROSS THE ISTHMUS

Although the Spaniards cruised along the Caribbean coast of the isthmus as early as 1501, the strategic importance of this place did not become apparent until Balboa crossed it to the shores of the Pacific in 1513. In 1519 an expedition founded the first town of Panamá (now Panamá Vieja, located some five miles to the east of modern Panamá). On the Caribbean coast several small ports in succession were used for the landing place. At first, Nombre de Dios was the chief Caribbean port; later, Portobelo, which is a little to the west of Nombre de Dios, and which has a somewhat more commodious harbor. Much later, when the railroad and then the canal were built, these little places were all but

abandoned in favor of Colón. On the Pacific side, however, the end of the pass remained more nearly fixed.

The importance of Panama City to the Spaniards was very great. From this place the expeditions set out to the conquest of the Pacific side of Central America as far north as Nicaragua, and to the conquest of the whole west coast of South America as far as remote Chile. Although Lima became the primary settlement center of western South America, all of the lines of connection between Lima and the mother country passed through Panamá. Here were gathered the goods sent out from Spain, and the treasure collected from the rich Americas to be sent back to Spain. Then, as now, Panama City derived its importance from the convergence of oversea interests: in its vicinity no very large area of rural settlement became established, for people came to Panamá on the way to some other destination—few of them came to stay.

With the collapse of the Spanish Empire in the new world, Panamá for a time lost some of its importance. But it was not many decades before the interests of a new maritime power began to touch the isthmus. When, as a result of the War with Mexico, the United States extended its borders to the Pacific in 1848, and almost at once the world heard of the discovery of the gold fields of California, there ensued a wild rush to this new source of riches. By all sorts of routes people not only from eastern United States but also from Europe made the long trip to California. All the pass routes across Middle America were tried: Veracruz to Acapulco, the Isthmus of Tehuantepec, the rift valley of Honduras, the lowland of Nicaragua, and Panamá. In 1850, great numbers of travelers arrived on the Caribbean side to cross to Panama City. As a result, the old mule-and-cart road which had served for so many centuries was replaced by a railroad which made use of the low pass at Culebra.

But the United States was not the only maritime power which looked covetously at Panamá. The idea of providing a passage for ocean boats across the isthmus had such obvious justification in terms of time saved on many different routes leading to Europe and eastern North America that several nations gave serious consideration to canal projects. Many of the British activities in the Caribbean during the nineteenth century were motivated by the idea of controlling the strategic approaches to a canal. The French, successful in the completion of the first of the world's great canals, the Suez, were the first actually to undertake the work in Panamá. In 1878 Ferdinand de Lesseps began operations for the construction of a sea-level canal, and continued until the collapse of his company in 1889. The French had failed to consider the serious effect

of the diseases carried by the tropical insects on the health and energy of the workers.

The Spanish-American War, perhaps more than anything else, made it clear to the United States that as a matter of defense alone, the digging of a canal was vital. An agreement was reached with Great Britain by which that country gave up all rights to the Panamá route in exchange for a guarantee of equal treatment in the matter of tolls for British and United States shipping. Negotiations for the right to a canal zone were being carried on with the Colombian government, when the people of Panamá, believing that the negotiations had fallen through and fearing that the Nicaraguan route would be selected instead, revolted and declared their independence from Colombia. The part played by the United States is not entirely clear, although it is certain that United States armed forces kept the Colombians from putting down the revolt, and that the United States government, with conspicuous haste, recognized and came to terms with the government of Panamá (4). Panamá granted to the United States "in perpetuity, the use, occupation, and control of a zone . . . of the width of ten miles on either side of the canal . . . for the construction, maintenance, operation, sanitation, and protection" of the canal.

Work on the canal started in 1904. A widespread attack on the problem of sanitation preceded and accompanied the actual digging. The conspicuous success of this attack has had a very great influence on the methods of combatting tropical disease throughout the world. Workers on the canal were recruited not only in the United States and in Europe, but also among the crowded Negro populations of some of the islands of the West Indies, especially Jamaica. A huge dam was constructed at Gatún, near Colón, impounding the water of the Río Chagres in a large lake. Access to the lake, which is some 40 feet above the Caribbean, is gained through locks. The Gaillard Cut carries the impounded water of the lake across to the Pacific side, where two sets of locks permit descent to the Pacific. On August 3, 1914, the first ship passed through the completed canal.

A strip of land on either side of the canal was designated as the Canal Zone, over which the United States has "as complete authority as if it were under the sovereignty of the United States." Panama City and Colón, however, which are within the twenty-mile strip, are excluded from the Zone and remain under the control of Panamá; within the Zone are the new cities of Cristóbal (adjoining Colón), and Balboa (adjoining Panama City). With so much at stake in the maintenance and defense

Japan nearly 10 per cent, and Germany about 8 per cent. A very considerable part of the revenue of the government of Panamá, however, is derived from taxes on services and sales to people passing through the canal (258).

Panamá, therefore, is unique among the states of Latin America. The dominant focus of its economic life is the canal; the canal brings it a certain amount of independence but at the same time a large measure of dependence on the United States. The peculiar importance of the canal cities is reflected in the geographic structure of the country—the existence of the large cities without any surrounding and supporting zone of settlement. The destiny of Panamá is closely tied up with the commercial, political, and military activities of people all over the world.

27

THE WEST INDIES: INTRODUCTION

GREAT BRITAIN, Spain, and Portugal were the three European nations that finally won out in the struggle to obtain control of the sources of wealth in the Americas. And scarcely had these three emerged victorious when their colonies declared themselves independent, separating, eventually into the present twenty-one Anglo-American, Spanish-American, and Portuguese-American republics. But Great Britain, Spain, and Portugal were not the only competitors: the other nations involved in the conflicts of the sixteenth to the nineteenth centuries were France, The Netherlands, Denmark, and even Russia (in northwestern North America). Germany and Italy entered the colonial field too late to obtain actual sovereignty over any part of the Americas, although in the modern period their emigrants and their commercial enterprises have played roles of great importance in all parts of the New World. The last of the great imperialist nations to turn its attention toward Middle America was the United States. Near the end of the nineteenth century, having completed the conquest of a once thinly populated continent, the "colossus of the north" began to look southward. Territory in the West Indies was annexed and there was a considerable amount of intervention in the domestic affairs of Latin-American countries. Not until the era of the Good Neighbor Policy were imperialist aims officially renounced.

Among the islands today there are three independent states: Cuba, the Dominican Republic (both descended from Spain), and Haiti (de-

scended from France). The rest of this part of the world is a patch-work of political sovereignties, including possessions of Great Britain, France, The Netherlands, and the United States.

THE WEST INDIES

The island chain which extends from Cuba and the Bahamas in the north to Trinidad and Aruba in the south includes islands of greatly contrasted size, geologic origin and surface form, and present political status. The three independent countries occupy two of the larger islands of the Greater Antilles. Two islands included in the Lesser Antilles belong to Venezuela. All the other islands belong either to Great Britain, or to France, or to The Netherlands, or to the United States. Great Britain's colonies include the three thousand odd islands of the Bahama group, Jamaica and its dependencies, the three islands of the British Virgin group, the eight Leeward Islands, and the seven or more Windward Islands. British possessions in the Caribbean area also include British Honduras, on the scantily inhabited east coast of the Yucatán Peninsula. The French West Indian possessions include six islands completely under French rule, and one island which is shared with the Dutch. The Netherlands, in addition to the island it shares with France, owns five others, three of which are off the coast of northern Venezuela. The possessions of the United States include Puerto Rico (and its dependency Vieques), acquired in 1898 by the defeat of Spain, and the three American Virgin Islands, purchased from Denmark in 1917. Altogether, in addition to the four large members of the Greater Antilles, and not counting the many small bits of land included in the Bahama group, there are more than forty inhabited islands in the West Indies. Scattered among these are innumerable smaller rocks and reefs.

Political Classification of the West Indies

Independent countries, former Spanish colonies
- Cuba
- Dominican Republic (on the island of Hispaniola)

Independent country, former French colony
- Haiti (on the island of Hispaniola)

Possessions of the United States
- Puerto Rico and Vieques
- Virgin Islands (St. Thomas, St. John, and St. Croix)

Possessions of Great Britain
- Bahama Islands
- Jamaica (and Grand Cayman, Little Cayman, and Turks Island)
- The Leeward Islands
  - British Virgin Islands (Tortola, Virgin Gorda, and Anegada)
  - Sombrero
  - Anguilla
  - Barbuda
  - St. Kitts (St. Christopher)
  - Nevis
  - Antigua
  - Montserrat
  - Redonda
- The Windward Islands
  - Dominica
  - St. Lucia
  - St. Vincent
  - The Grenadines
  - Grenada
- Barbados
- Tobago
- Trinidad

Possessions of France
- St. Martin (in part)
- St. Barthélemy
- Guadeloupe, Désirade, Iles des Saintes
- Marie Galante
- Martinique

Possessions of The Netherlands
- St. Martin (in part)
- Saba
- St. Eustatius
- Bonaire
- Curaçao
- Aruba

Possessions of Venezuela
- Margarita
- La Tortuga

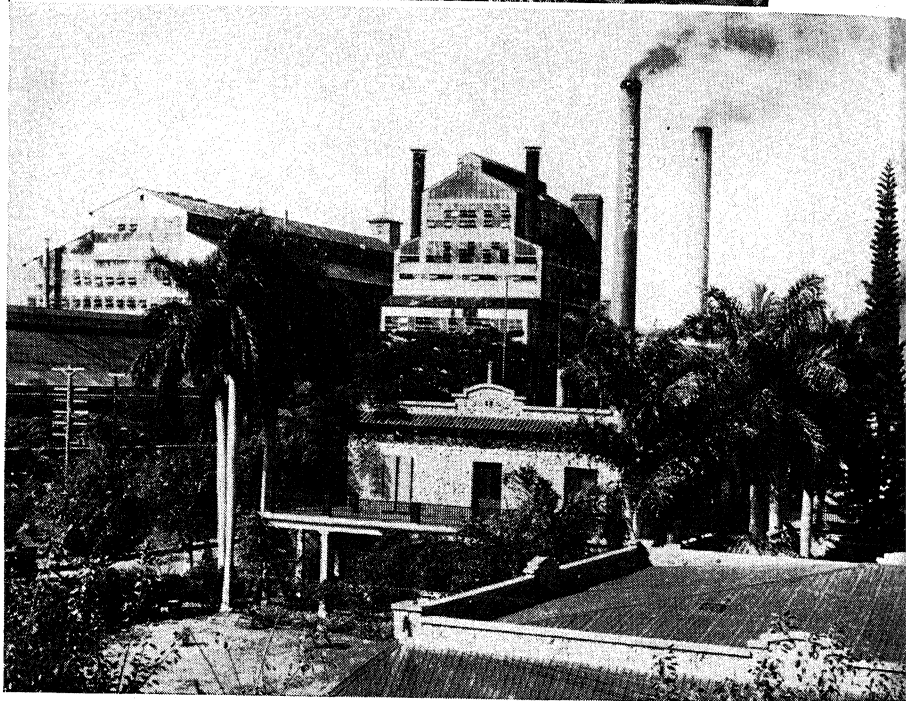
Nature of the Islands

The islands of the West Indies are diverse in their geologic structure and their present surface features (198). Superficially the whole island chain might seem to be formed by the crests of one partly submerged mountain arc. Actually, however, there are several mountain systems involved, and the islands are in various stages of the process of growth and denudation.

One of the main mountain systems which produce the West Indies is that which extends from Anegada Passage in the east (east of the British Virgin Islands, Map 144), to the ranges of Central America in the west—the so-called Central American-Antillean system. The main axes of mountain growth have the form of a two-pronged fork. The handle of the fork is in the east, extending in one single line of uplift from St. Thomas through Puerto Rico, and through the western part of Hispaniola[1] to the Cordillera Central of the Dominican Republic. Here the whole system reaches its greatest elevation of almost 10,000 feet. In the western part of Hispaniola the two prongs of the fork emerge, one forming the southern peninsula of the Republic of Haïti, the other the northern peninsula. The southern range continues under the Caribbean, emerging to form the Blue Mountains of Jamaica, and several banks and miniature islands between Jamaica and the northeast corner of Honduras. The east-west ranges of Honduras and the central part of Guatemala form the western extremity of this system. The northern range, leaving the northern peninsula of Haiti, appears again in the Sierra Maestra in southeastern Cuba. It also is submerged under the waters of the Caribbean, appearing above the surface only in a few small islands such as the Little Cayman and Grand Cayman. It reaches the shore of Central America north of the Gulf of Honduras and crosses westward through Chiapas and Oaxaca in Mexico to the shore of the Pacific, interrupted at several places by transverse depressions.

North of the Central American-Antillean system there are several areas which, although separated by stretches of water, are related structurally. These are the limestone platforms, including the Peninsula of Yucatán, the main part of Cuba, most of the Bahama Islands, and the Peninsula of Florida.

[1] The United States Geographic Board adopted the name Hispaniola to apply to the island occupied by Haiti and the Dominican Republic. There is some historical precedent for this, although the European writers are accustomed to refer to the whole island as Santo Domingo. There is no justification for the designation of the whole island as Haiti.

Frederick Street (*above*) is the center of the shopping district in Port-of-Spain, Trinidad. The overhanging balconies and low-hanging awnings are needed here as protection both from the heat of a tropical sun and from drenching rains which come suddenly — and as suddenly cease. (Courtesy of the Alcoa Steamship Company, Inc.) The lower picture shows Parque Colón, the main plaza of Ciudad Trujillo in the Dominican Republic. In the center of the plaza is a statue of Christopher Columbus. At the left is the cathedral of Santo Domingo, the oldest in America. After its completion in 1541, it became the tomb of Columbus. (Courtesy of the Dominican Chamber of Commerce of the United States.)

The upper picture shows the harvesting of sugar cane on a Cuban plantation. Because of the rapid loss from fermentation after the cane has been cut, it must be brought quickly to the sugar mills for the extraction of the juice. It is true that on most plantations oxen must be used to haul the cane from the fields to the railroads, but from there on shipment to the mills is speedy. (Courtesy of Pan American Airways.) Below is a photograph of the big sugar mill and refinery owned by the Hershey Company. (Courtesy of the Hershey Estates.)

The upper photograph is a scene in rural Haiti. In the foreground is an oxcart load of logwood. This is a product of the dry scrub forests and has long been one of Haiti's most dependable exports. Behind the cart are typical Haitian houses, with walls of mud plastered on poles and with thatch roofs. (Courtesy of Pan American Airways.) Below is a photograph of a tobacco plantation in Yauco, Puerto Rico. Tobacco from this island is widely used as cigar filler for both medium and high-priced cigars sold in the United States. (Courtesy of the Puerto Rico Institute of Tourism.)

The picture on the left shows a banana plantation in Jamaica. As the bunch begins to form in the center of the sheaf of leaves the stem grows upward, but later, when the bunch is fully formed, the weight bends the stem down. (Courtesy of Pan American Airways.) Below is a cacao plantation in Trinidad. The cacao beans are embedded in pods attached by short stems to the trunk and branches of the tree. The cacao tree cannot survive cold or dry weather. It does best in a hot, humid climate, where there are no winds to reduce the dampness and make the sensitive stems brittle. Here the "movie" kind of tropical climate is found.

From either end of the Central American-Antillean system mountain chains of volcanic origin extend southeastward to connect with the continent of South America. In the west this mountain connection forms the backbone of Costa Rica and Panamá, and the chain stands high enough to make the land continuous. In the east the mountain connection consists of a string of volcanic islands, with deep passages between them, known as the Lesser Antilles. On the crest of the submerged arc which extends from the Anegada Passage in the north to the northeastern corner of Venezuela in the south, a series of volcanic cones have been built by successive eruptions until they stand, in some cases, high above the sea. Some of the cones are still in process of active growth; some have become quiet and are being worn down by the processes of stream dissection on their sides and wave cutting around their bases; some are very old and have been worn down until only the stumps of the volcanoes remain. And since these cones stand on an unstable sea floor which has a tendency to subside, many of the older islands are deeply embayed and some have disappeared entirely below the water.

The West Indies lie within that portion of the tropical seas in which coral reefs can form. Corals can exist only where the ocean water is free from silt, and where its temperature does not drop below 68°. The corals attach themselves to the shores of islands where these conditions exist and form fringing reefs. According to the coral-reef theory set forth by Darwin and Davis (266), the reefs are built higher and higher as the island sinks, with the result that they remain within the zone reached by the salt spray of the ordinary waves; but the submergence of the island reduces the area of the land and leaves the coral growth as a barrier reef, some distance off shore. In some cases the original island may be entirely submerged, leaving the coral formation as a circular atoll, with a shallow lagoon in its center. On the other hand, in those cases where the islands have been raised rather than lowered, the reefs form a sort of collar of limestone, elevated above the sea, as has occurred on Jamaica. All stages of island growth and destruction and of the development of coral reefs can be observed in the West Indies.

In spite of the existence of all these varied island forms, however, it is possible to group the Lesser Antilles into two categories. There are the islands which are relatively low, and which include considerable areas of more or less level limestone reefs. These are the older volcanic cones, long since quiet and generally subsiding; these are found chiefly on the outer or eastern side of the island arc. And in contrast to these low-lying islands are the mountainous ones, some still in the process of

growth. The chief islands of the Lesser Antilles, classified in this way, are presented in the following table:

LOW-LYING AND MOUNTAINOUS ISLANDS OF THE LESSER ANTILLES *

(Maximum elevation in feet)

Low-lying Islands	*Mountainous Islands*
Anguilla (213)	Saba (2,820)
St. Martin (1,360)	St. Eustatius (1,950)
St. Barthélemy (992)	St. Kitts (4,314)
Barbuda (115)	Nevis (3,596)
Antigua (1,330)	Redonda (1,000)
Grande-Terre (eastern part of Guadeloupe—very low)	Montserrat (3,002)
Désirade (912)	Guadeloupe (4,869)
Marie Galante (672)	Iles des Saintes (1,036)
	Dominica (4,747)
	Martinique (4,428)
	St. Lucia (3,145)
	St. Vincent (4,048)
	The Grenadines (series of rocky islands, highest one about 1,000)
	Grenada (2,749)

Several of the mountainous islands have still more or less active volcanoes, and two of these volcanoes have erupted with great violence during the present century. Mt. Soufrière on Guadeloupe killed more than 2,000 persons when it erupted on May 7, 1902. The eruption of Mt. Pelée on Martinique the next day covered the surrounding parts of the island with a deep layer of ash and resulted in the destruction of the city of St. Pierre with the loss of 40,000 lives. Mt. Pelée's ash is of such a chemical composition that it provides little plant food, with the result that the area covered by ash remains even today barren wasteland. Mt. Pelée itself was 4,438 feet in elevation before the eruption: after the eruption it was 4,500 feet high. The mass of material blown out through its vent is estimated to equal in bulk the whole island of Martinique.

Of still different geologic origin are the continental islands related to South America. The most easterly of these is Barbados. This island, twenty-one miles long by fourteen miles wide, is composed of a gently rolling limestone tableland, with a maximum elevation of 1,100 feet. It is formed by an upraised portion of the continental shelf, and now

* After Schuchert, 198.

stands on a wide platform only slightly submerged and bounded by barrier reefs.

Closer to the South American coast the islands are even more directly related to the mainland structures. The little island of Tobago is formed along a mountainous backbone, the highest elevation of which is 1,900 feet. Trinidad has a range of mountains along its northern side which reach 3,000 feet in elevation, but the southern part of the island is made up of two hilly belts with mangrove-filled bays along the coasts between the hills. There are no corals on Trinidad, for this whole coast is bathed with silt from the Orinoco. The islands of Margarita and Tortuga off the Venezuelan north coast are part of the Caribbean Coastal Range. The three Dutch Islands of Bonaire, Curaçao, and Aruba are formed of ancient crystalline rocks, similar in geologic structure to the Goajira Peninsula of Colombia.

Climate

In places like the West Indies one finds the truly "temperate" climates of the world. These islands are bathed by currents of warm ocean water and swept by the easterly trades of the open sea. The temperatures are moderately high, and vary little from season to season. In Habana, Cuba, for example, the average temperature is 76.9° with a range between warmest and coldest months of about 10°; San Juan in Puerto Rico has a range of less than 6°; and Bridgetown in Barbados has a range of only about 4°. From Habana to Bridgetown the average of the warmest month is about the same—between 80° and 82° (except Port-au-Prince, Haiti, which is in a lowland pocket protected from the moderating influence of the open sea). The winters, however, average a little lower in Cuba than in the islands farther east because of the exposure of that island to the cold air masses which emerge from North America during that season. In every month of the year the maximum temperatures are about the same; but the minimum temperatures of the winter are much lower than the minimum temperatures of summer, and this has the effect of lowering the monthly average. Excessively high temperatures, such as are experienced in the Middle West of the United States, never occur in the West Indies; but neither are the cold waves characteristic of midlatitude winters experienced. The climate of the West Indies is truly temperate.

The easterly trade winds which blow day and night throughout the year produce great differences in rainfall on the eastern and western sides

of the mountainous islands. From the warm ocean water the air picks up large quantities of moisture, so that a very slight rise of the air and consequent cooling results in the formation of towering cumulus clouds and heavy downpours of rain, mostly of short duration. The rains are heaviest on the windward sides of the islands. In Jamaica, for example, the average annual rainfall at a station on the northeast side of the Blue Mountains is 222 inches; at Kingston on the south side of the island, some thirty miles distant, the average annual rainfall is only about 29 inches. The eastern sides of the islands, too, are exposed to the highest waves, so that especially for the sailing ships of the period of earliest settlement, the protected western sides offered the safest anchorages. Almost all the chief towns on the islands are now on the lee sides.[2]

Commonly throughout the West Indies there are two rainy seasons and two dry seasons. The first rainy season usually comes in May, though sometimes in June or July; the second rainy season comes in October or November. Trinidad, however, has only one rainy season: from June to December. The rain comes in the form of violent showers, followed by rapid clearing—showers which come at shorter and shorter intervals as the day progresses, followed by clear skies at night and in the early morning.

Few parts of the world offer a climate of greater comfort, especially in places exposed to the sweep of the trades, than do the West Indies. There are persons who feel the need of the stimulating effect of rapid weather change and of the low temperatures characteristic of the mid-latitude winters, and who, therefore, find the West Indian climate too relaxing; but there are others who, in spite of the popular preconception regarding tropical climates, find themselves able to live in these islands with a maximum of comfort and without losing their capacity to work (205).

But the West Indies do not always remain undisturbed by climatic violence. This is one of the parts of the world in which tropical cyclones, or hurricanes, are frequent occurrences. The hurricane season begins in August and lasts through October. Of all the storms reported between 1887 and 1923, August had 16 per cent, September had 33 per cent, and October, 30 per cent. These storms originate, apparently, off the coast of Africa and sweep westward toward the Lesser Antilles, bending toward

[2] In this connection it should be noted that the designation of the northern group of Lesser Antilles as "Leeward Islands" and the southern group as "Windward Islands" has no basis in terms of wind direction. The prevailing trades of this part of the world come from the northeast and the east.

the north as they proceed. The island of Trinidad never experiences these violent storms, and the southern members of the Lesser Antilles rarely, but the northern West Indies are frequently traversed by them. The hurricanes follow two chief tracks. One crosses the Caribbean to the Yucatán Channel, and thence proceeds across the Gulf of Mexico, where the storms either ravage the Gulf Coast of the United States, rapidly losing violence as they proceed into the interior, or curve toward the east again across Florida. The other track follows the Lesser Antilles, passing east of Puerto Rico, across the Bahamas to the east coast of the United States, after which it curves again toward the east, following the Gulf Stream. Of course there are many storms which fail to proceed along the usual tracks, and which do unexpected damage to the eastern part of the United States—all the way from southwestern Texas to New England.

A hurricane is a great whirl of air—like a dust whirl that forms over a country road on a hot summer day, only on a vastly larger scale. In the northern hemisphere it rotates always in a counterclockwise direction. Hurricanes cover hundreds of miles of territory, and even those places which do not experience the destructive violence of the storm's center, are visited by high winds. Hurricanes also bring extremely heavy downpours of rain—in fact the world's heaviest rainfalls in short periods are brought by these storms. During a typhoon—which, in the western Pacific, is the equivalent of the West Indian hurricane—Baguio in the Philippines received a rainfall of 48 inches in 24 hours, the world's record.

Course of Settlement

It was to the West Indies that the Spaniards came on that momentous first voyage of Columbus in 1492. To the everlasting confusion of succeeding generations, Columbus, believing that he had come upon the eastern coast of Asia, made use of the name, the West Indies, and designated the native inhabitants as Indians.

The first permanent white settlement in America was made in 1496 at the site of the present Ciudad Trujillo, on the southern shore of Hispaniola. On this island the native peoples numbered perhaps a million, making this the most densely populated of the West Indies; and also on this island the Spaniards promptly discovered that the stream gravels contained gold. The result was a "gold rush." By 1513 there were seventeen towns on Hispaniola, and already the problem of the exploitation of the native peoples was worrying the authorities. Meanwhile, the

first settlement had become a primary settlement center, for colonies were sent out from it not only into the interior of Hispaniola, but to other parts of the West Indies and even to Panamá. In 1509 a town was founded in Puerto Rico; later, because of unhealthful conditions at the first site, the colony was transferred to the present San Juan (1511). Also in 1509 a colony was established in Jamaica. The occupation of scantily populated Cuba began in 1511, and the city of Habana was founded in 1515. From Habana Cortés started out on his voyage of conquest to Mexico.

The Indians of the northern West Indies were, therefore, the first to feel the destructive effects of the Spanish conquest. At first friendly, they soon turned hostile, for in spite of the efforts of the authorities, the natives were set to hard labor in the placer mines, or on the plantations. The new European diseases introduced among these people had a devastating effect: in 1542, Las Casas reported that the Indians in Hispaniola, Puerto Rico, Jamaica, and Cuba were almost all gone. Only in some of the mountain valleys of the Lesser Antilles could small remnants of the Caribs and Arawaks, who once occupied the whole region, find a refuge sufficiently isolated to permit their survival (207).

Sugar Cane[3]

The great development of the West Indies did not begin for a century or more after the earliest Spanish conquest. By that time the main stream of Spanish settlement and the chief focus of Spanish interest had shifted to Mexico and Peru, and the older West Indian settlements were neglected.

The Portuguese in Brazil were the first to recognize and develop the possibilities of sugar cane as a commercial plantation crop, produced by Negro slaves. Before the sixteenth century sugar had long been known in Europe as an expensive luxury, sometimes prescribed in small quantities as a medicine. But when the Portuguese planters of Pernambuco began to put their product on the market at very much lower prices than had been possible before, the taste for sugar began to spread rapidly. The Portuguese enjoyed their first period of speculative production: for nearly a century they had a virtual monopoly of a rapidly growing market. Then in 1624, the Dutch occupied the Northeast of Brazil. When they were driven out in 1654, the plantations began to show signs of decreasing yields; little by little during the latter part of that century, the center

[3] See the excellent summary of the economic history of sugar planting presented by Derwent Whittlesey in reference 208, pp. 41–49.

of sugar production shifted from the Northeast of Brazil to the West Indies.

At first the most valuable sugar colonies were on the Lesser Antilles. Especially on the low-lying islands, but also around the margins of the mountainous islands, plantations could be laid out so that each owner could have his own port. The small size of the islands made the control of the slaves and the defense against attack a much easier matter than on the mainland. The island settlements, too, were less subject to the ravages of insect-born diseases than were the mainland settlements. For these reasons, the European nations came to value these colonies far more than the relatively unproductive colonies in North America. Since the islands could produce all the sugar Europe could possibly consume there was no need to seek larger areas.

The advance of sugar planting into the Greater Antilles came during the eighteenth century. The western part of the island of Hispaniola, which belonged to France, became one of the world's leading sugar-producing areas, and the planters, with the help of their many black slaves, reaped enormous rewards. Jamaica was also developed as a sugar colony, and after the revolt of the slaves in Haiti had destroyed the plantations there, Jamaica for a time was the leading producer. Sugar planting in the Spanish colonies of Cuba, Puerto Rico, and Santo Domingo, however, did not increase rapidly. The lack of good roads and the lack of interest in building roads, as well as the interest of the Spaniards in other sources of wealth, left these colonies in a minor position among the sugar producers. The following table presents the distribution of sugar production late in the eighteenth century.

SUGAR PRODUCTION IN THE EIGHTEENTH CENTURY *

Colonies	*Year*	*Metric Tons*
French	1788	93,045
English	1781–85 (av.)	78,029
Portuguese	1796	34,276
Danish	1768	20,029
Spanish	1790	13,993
Dutch	1785	8,892

During the nineteenth century this first wave of sugar prosperity began to ebb. The planters were faced with two chief difficulties. The first of these was the rise of beet-sugar production in the middle latitudes of

* Adapted from J. J. Reese, 208.

both Europe and the United States. Beet sugar production made its start during the time of Napoleon, when Europe was largely shut off from outside supplies. After the defeat of Napoleon the beet-sugar growers were able to hold a part of the sugar market, aided at critical moments by tariffs and subsidies. Although beet sugar cannot be produced as cheaply as cane sugar, it has two advantages which commend it to the farmers of Europe and North America. One is the increased independence of foreign sources of supply, and the other is the increased yields of grain which can be had from soil previously used for sugar beets. As a result, the beet-sugar producers have been able to capture a larger and larger share of the world's sugar market, in spite of the higher cost to the consumers. The following statistics reveal the progress of beet-sugar production between 1850 and the First World War:

World Production of Sugar *

(Excluding India)

Years	*Thousands of Tons*	*Per cent Cane*	*Per cent Beet*
1850–1851	1,507	90.6	9.4
1859–1860	2,127	79.5	20.3
1860–1870 (av.)	2,323	71.4	28.6
1870–1880 "	3,357	58.6	41.4
1880–1890 "	5,242	47.8	52.2
1890–1900 "	8,296	41.2	58.8
1900–1910 "	12,578	42.4	57.6

The second difficulty faced by the sugar-cane planters was the abolition of slavery. Negroes were first given their freedom in the British colony of Antigua in 1834, and in the rest of the British possessions in 1836. The other parts of America followed this lead over a period of fifty years: French possessions in 1848; Dutch possessions and the United States in 1863; Puerto Rico in 1873; Danish possessions in 1876; Cuba in 1880; and Brazil in 1888. During this period sugar production was reorganized on the basis of wage workers, tenants, or small independent planters selling to nearby mills. Modern sugar planting is a large scale business requiring big capital investment.

In the present century the world sugar cane production is concentrated on the island of Cuba—now the world's leading source of this

* After Whittlesey, 208.

commodity. Long backward and neglected, Cuba was at last transformed from a poor cattle country to a thriving land of cane plantations chiefly as a result of investments of capital from the United States. The Spanish-American War (1898), which gave Cuba its political independence, also opened the way for the last great invasion—this time an economic invasion—of the rich sugar lands of the West Indies.

28

REPÚBLICA DE CUBA

Total area, 44,164 square miles

Total population, 4,227,597

Capital city, Habana; population, 568,913

Trade per capita:

Imports: $25.80
Exports: $34.73

Unit of currency, peso ($1.00, gold content value)

Major commercial products in order of value:

- sugar
- molasses
- tobacco and cigars
- bananas
- copper
- manganese
- hides
- rum
- sponges

Railroad mileage, 3,030

(The above statistics are for the year 1938.)

28

CUBA

CUBA is the Latin-American republic which lies closest to the United States. This is true despite the fact that Cuba is separated from mainland North America by the Straits of Florida, whereas Mexico's national territory adjoins the territory of the United States along a land boundary. From a geographical point of view the proximity of one country to another is not only a matter of political boundaries and areas; it is also a matter of the position of the nucleus of population, government, and commercial interest in one country in relation to the nucleus of the other country. The nuclear area of the United States borders the Atlantic from Washington to Boston, and extends westward through the southern part of the Lake states at least to Chicago. The nuclear area of Mexico is remote indeed from this part of North America—even remote, as we have pointed out, from the border of Texas. Cuba, among all the Latin-American republics, is situated in the closest proximity to the urban nucleus of the United States.

The significance of this geographic position has varied with the changing attitudes, objectives, and stage of economic development of the people on the mainland. For a long time Cuba was quite neglected. The main course of Spanish conquest was directed elsewhere. Except for a few North Americans who coveted the tropical island to the south for its strategic importance, or as a potential addition to the list of slave states, Cuba remained of little interest to a people who were facing westward rather than southward. A Cuban insurrection

against Spanish rule in the 1870's aroused little desire in the United States for the rescue and liberation of an oppressed people. But twenty years later, another insurrection was met with a wave of sentiment in the United States demanding military intervention for the purpose of bringing freedom to the Cubans. Without joining the ranks of those few extremists who brand all business enterprise in foreign countries as nefarious, we must nevertheless point out that by 1896 investments by people of the United States in Cuba had mounted to between thirty and fifty million dollars. The United States was facing southward across the Caribbean as well as westward across the Pacific. Only an aroused public opinion, opposed to imperialistic expansion into territory already populated, kept the United States from extending its political area over Cuba as it did over Puerto Rico and the Philippines. Every kind of control except sovereignty, however, was applied to the newly created republic; and under the protection of the government the development of new sugar-cane plantations went forward at a rapid rate.

During the present century Cuba has risen to first place in world sugar production. In 1938, it accounted for 86 per cent of the sugar exported from Latin America. At the present time the per capita value of Cuba's exports is greater than that of any other Latin-American country except Venezuela. Approximately 75 per cent of Cuba's exports and imports are to or from the United States. The destiny of this nearest of the Latin-American states is closely linked with that of its continental neighbor; as the United States looks more and more frequently toward the south, the first country that comes into sight is Cuba.

THE LAND

More than half of the land area of the West Indies is in Cuba. The 44,000 square miles of territory extend for 785 miles in an east-west direction, with a width which varies from 25 to 120 miles. Of great significance today is the fact that at least half of the area is level enough to be suitable for machine agriculture. The soils of Cuba prove to be well adapted to a variety of crops, of which sugar cane is only one. The "temperate" tropical climate, with no frosts, only infrequent hurricanes, and with adequate and well-distributed rains, is ideal for tropical plantation agriculture. The fact that much of the island is well drained and is swept by unobstructed easterly winds reduces the problem of sanitation and the difficulties of an attack on insect-carried diseases. For the Spaniards of the colonial period these advantages were outweighed by the

disadvantage of a scanty native population; for the North Americans of the modern era, with money to risk on speculation in tropical plantations, the Cuban land has an eloquent appeal.

Surface Features

Not more than about a quarter of the area of Cuba is mountainous. The most rugged country is to be found at the southeastern end (Map 130). West of Guantánamo Bay, and north of the port of Santiago de Cuba, the steep slopes of the Sierra Maestra overlook the sea, rising to elevations of nearly 8,000 feet. The northern side and eastern end of the Sierra Maestra are bordered by the Guantánamo Valley, a gently rolling hilly country which leads out to the head of the bay. East of Guantánamo Bay stands a rough, stony highland, deeply dissected by streams, and including few patches of flat land. In this highland are found the Cuban manganese, copper, chromium, and iron ores exploited now by North American companies; but from an agricultural or a pastoral point of view the district is one of little value.

There are two other small mountainous areas. Near the middle of the island are the Trinidad Mountains, the maximum elevation of which is a little over 3,700 feet. And in western Cuba, west of Habana, there is the long, narrow Sierra de los Órganos, reaching a maximum elevation of about 2,500 feet. At the western extremity of Cuba is the rugged hill country known as the Guaniguánicos, of special interest because of its extraordinary scenery. This is a region late in a cycle of karst erosion, in which steep-sided limestone blocks, honeycombed with caverns, stand like great castles above irregular-shaped, flat-bottomed valleys.

Outside of these hilly or mountainous districts, the remaining three-quarters of Cuba is composed of gentle slopes. Partly on limestones, partly on other types of rock, a series of terraces have been formed, now somewhat dissected by the short streams so that in certain localities the terrain is moderately hilly. Along many sections of the coast the land is swampy, but most of Cuba is well drained. Where the terraces border the sea, the coast is cliffed; and there are many deep, pouch-shaped bays which form ideal natural harbors. Outstanding are the harbors of Habana, Santiago de Cuba, and Guantánamo.

Climate and Vegetation

Because of the generally moderate relief of Cuba, this island shows less of the contrast between windward and leeward sides than any of the other

West Indies. In fact the heaviest average rainfall occurs in the western part of the island, for this section lies closest to the hurricane track. No part of Cuba is deficient in moisture; and one of the notable features of the rainfall is its dependability during the critical agricultural season from May to November. Its two rainy seasons correspond with the general rainfall regime of the West Indies. The temperatures are uniform, with no very great extremes. It is true that a temperature of 100° was recorded in Habana in July, 1891, but such heat is a rare phenomenon in this part of the tropics. Also a minimum of 49.6° was recorded in February, 1896—which is somewhat lower than the minima of stations farther to the east, because western Cuba lies in the path of the winter cold air masses from North America. Although they never bring freezing weather to Cuba, these cold air masses do sometimes arrive in that country as cool waves.

A relatively small proportion of Cuba was originally covered with a dense forest. In 1899 only about 27 per cent of its area was still forested. A considerable part of the limestone-terrace lands was covered originally by a tall grass savanna with scattered pines and palms—a vegetation type not unlike that of southern Florida. Scrub forest, in 1899, occupied 14 per cent of the area.

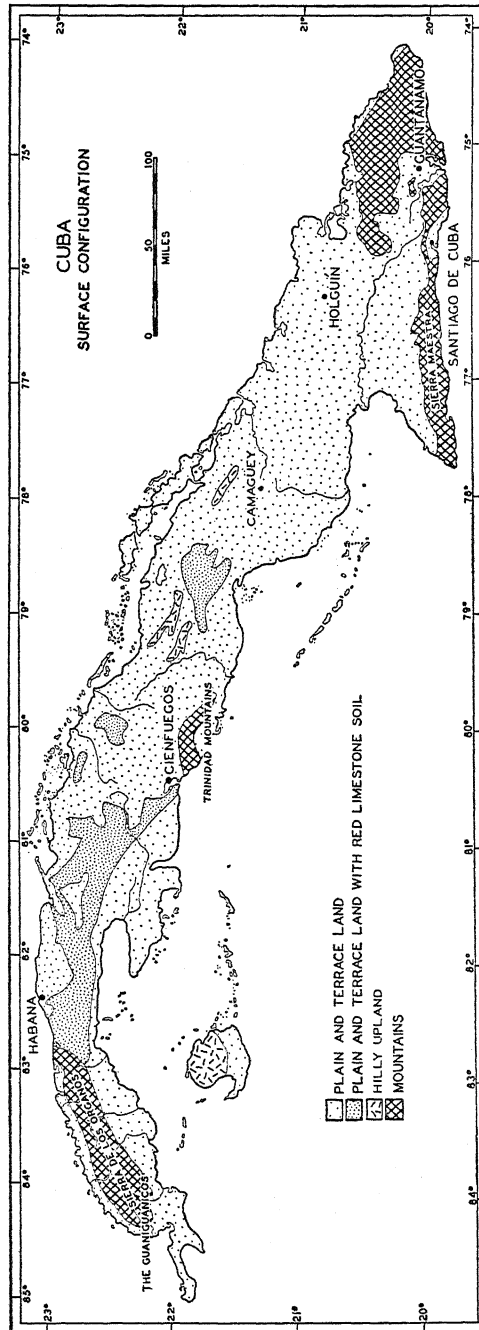
THE PATTERN OF SETTLEMENT

The settlements established by the Spaniards in the sixteenth century were maintained chiefly to hold the strategic defenses of the routes into the Gulf of Mexico and the Caribbean. Habana was a fortress town. Inland, the scanty Indian population—which was soon all but wiped out—and the open nature of the vegetation cover led to the use of the land for the grazing of cattle. Large cattle estates were granted by the Crown. In many cases the properties were defined as including all the land within a league of a central point; the position of the estate headquarters was carefully noted, but the outer boundaries of the surrounding grazing lands were left indefinite. As long as Cuba remained a scantily occupied pastoral country, this circular pattern of properties caused no difficulties, but much confusion has come from it in the modern period of closer settlement (280).

The long period of Spanish control produced only one chief cluster of rural population. This was along the northern coast, inland from the city of Habana, and lying mostly within a radius of not over 30 or 40 miles from the capital. Outside of this one area of relatively concentrated

settlement, there were several coastal towns, each with a small zone of rural settlement around it—such as Cienfuegos, Santiago de Cuba, and others. But the interior of the island remained almost uninhabited except for the seminomadic cattle herders, and the small scattered settlements at the estate headquarters.

The central area of concentrated settlement was utilized during the eighteenth and nineteenth centuries for sugar production with the aid of slave labor. In 1850 the population of Western Cuba (which included Pinar del Río, Habana, and Matanzas) totaled about 734,000, which was nearly 65 per cent of the population of the whole island. Of the population centering on Habana, 325,000 were white people, mostly of pure Spanish descent; and 409,000 were Negroes, most of them still slaves. The chief product of the area was sugar, raised on large estates; but there was also a considerable amount of tobacco and coffee.

Map 130

So long as Cuba remained a colony of Spain it was badly neglected. Roads were poor or nonexistent; methods of production were primitive and costly. The census of 1899 indicated that at that time about 47 per cent of the land in crops in all of Cuba was devoted to sugar cane, smaller percentages to yams, tobacco, bananas, maize, and other food crops; 1.6 per cent to coffee. At that time only 3 per cent of Cuba was cultivated.

Rise of Sugar Cane Planting

The treaty of 1903 between the United States and Cuba gave Cuban sugar a place on the preferred list for imports into the United States, the world's largest market for sugar. It also reserved to the United States the right of intervention in Cuban domestic affairs, a right which was used repeatedly until the treaty was abrogated in 1934. Because Cuban sugar paid a lower duty than other sugars imported from foreign countries, and because security was gained by the right of the United States government to intervene in Cuba, North American capital amounting to more than a billion dollars poured into the newly created republic. Roads and railroads were built; Habana was modernized; and in the rural districts new sugar mills were built to equip the sugar producers with the very latest technical devices for grinding the cane and extracting the raw sugar. In technical equipment no part of the world could compete with Cuba. The cost of production per unit was reduced three or four times as a result of this new capital investment.

The large cattle estates of the colonial period were broken up and parts of them were recombined to form the new sugar plantations. On the new estates, a very large proportion of the land is still devoted to the grazing of cattle, especially as much of the work of plowing the fields and transporting the cane is done by oxen. Only a relatively small number of the estates are worked by the owners with wage labor; most of the area devoted to cane is rented out to tenants. In Cuba as a whole, some 80 per cent of the production comes from tenants and small independent planters. These small producers, however, are tied to the large estates because of the presence thereon of sugar mills. After the cane is cut it must be brought to the mill and the juice extracted within forty-eight hours; otherwise fermentation sets in which results in a loss of at least 2 per cent per day in the yield of sugar. Therefore the tenants and independents in the vicinity of a mill must sell to the large landowner.

The owners of Cuban mills are mostly North Americans and Cubans.

These two together accounted for 77 per cent of the production in 1939. The following table presents the distribution of ownership:

OWNERS OF CUBAN MILLS, 1939 *

Nationality of Owners	*Number of Mills*	*Per Cent of Production*
United States	67	55
Cuban	55	22
Spanish	33	15
Canadian	10	5
British	4	1
French	3	1
Dutch	2	1
Total	174	

Labor in an area of sugar production is seasonal to an extreme. At harvest time, from December to June, there is an enormous increase in the need for workers. Cane is cut at the rate of more than a hundred acres a day, which, on an ordinary estate, requires the services of more than a thousand laborers. The transportation of the harvested cane to the mill requires as many more, working constantly to keep a steady supply coming in to the big machines. With four million inhabitants, Cuba has a density of population of only a little over 90 people per square mile, as compared with 233 per square mile in Jamaica, 280 per square mile in Haiti, and 530 per square mile in Puerto Rico. Anxious to defend herself from an influx of people who would come from these densely populated islands to seek employment offered by the sugar plantations, Cuba admits workers for the harvest season only. Many thousands come at that time from Haiti and Jamaica, but return to their homes when the work of the harvest has been completed. During the rest of the year unemployment in Cuba is a serious problem.

The advance of the sugar frontier in Cuba resembles that of the coffee frontier in São Paulo during the 1920's. It is essentially a hollow frontier —a wave of land exploitation which rolls on when the areas first occupied begin to show signs of decreasing yields. Starting in the district around Habana in the 1890's, the first new plantations opened up at the beginning of the sugar period were toward the south and east. Here a wide belt of first-class sugar land is to be found (Maps 130 and 131). The underlying limestones weather into a deep red soil which shows no appre-

* From *Annuario Azucarero de Cuba*, 1940, p. 53.

ciable chemical or physical change for as much as twenty feet below the surface (265). This is a typical low-latitude soil—deficient in silica and high in the iron and aluminum compounds. The chief element in its productivity for shallow-rooted crops is its porosity. Clay soils through which water cannot penetrate easily are generally considered poor; but this red soil of Cuba has a physical structure in which the clay particles are grouped together in floccules, leaving wide pore spaces for the downward percolation of water. As a result there is very little run-off and almost no soil erosion, and there is so little stickiness that plowing can be started within a few hours after a rain. Along the axis of this ideal soil type the sugar frontier began to swing eastward.

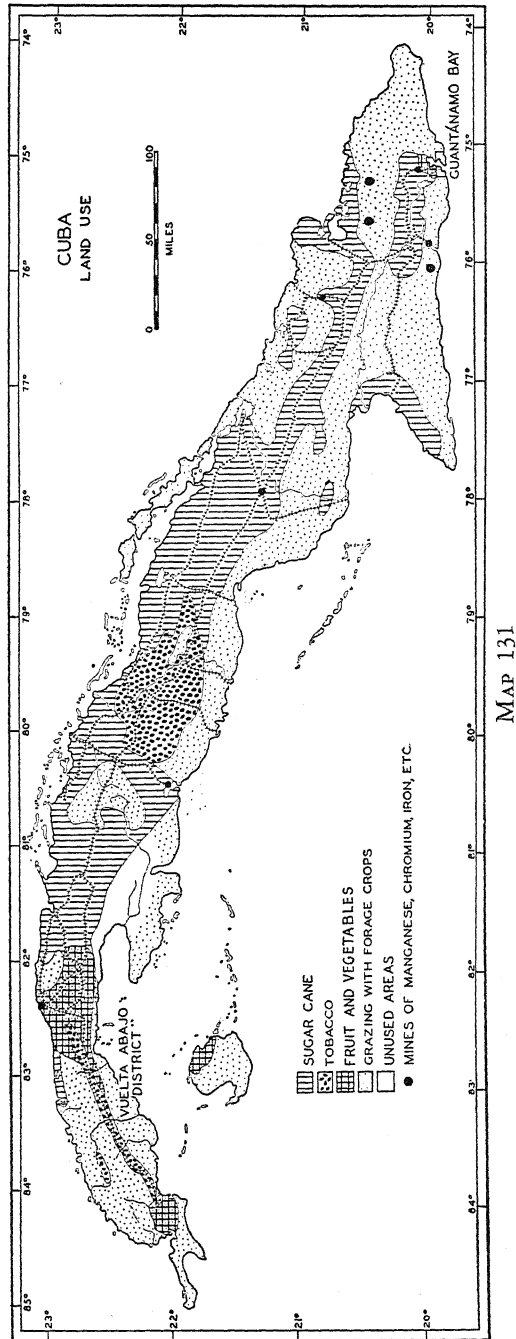
The red soils continue approximately to the eastern border of the province of Matanzas. Beyond this the soils are varied. There are patches of red limestone soils, there are deep sandy soils of fair productivity in terms of cane, and there are areas of clay which are difficult to work in wet weather. Nevertheless the sugar frontier did not stop its eastward movement; with declining yields, which appear after a few years on the poorer soils, there is a tendency to abandon the land and clear new areas. In 1920 the largest concentration of sugar production was still in Habana and Matanzas, but the proportion of the total crop raised on these first-class lands became less and less as more lands were cleared in the eastern part of the country. In 1920–21 about 30 per cent of Cuba's sugar was raised in the two provinces of Habana and Matanzas; Santa Clara, the next province to the east, raised 24 per cent, and the Oriente, or easternmost province, raised 20 per cent. Only in the wetter western province of Pinar del Río was there little cane production—scarcely 2 per cent of the total.

Sugar Planting since 1920

The expansion of the sugar plantations of Cuba continued merrily throughout the period of the First World War. At the conclusion of the war, the various countries of the world, with stocks of sugar depleted and the beet crop insufficient to supply the demand, began to buy Cuban sugar at an unprecedented rate. The result was one of those flurries of speculation so characteristic of tropical plantation production. Early in 1920 the price of raw sugar rose from seven or eight cents per pound to the dizzy height of about twenty-four cents a pound. The income from an acre of good cane land in that year amounted to as much as a thousand dollars. Properties were sold and resold with higher and higher

valuations; the landowners began to build themselves new homes—along the ocean front near Habana rows of palatial mansions began to appear, each more pretentious than its neighbor. Money was spent as if the supply might be inexhaustible. But then came the inevitable crash: before the end of 1920 the price had fallen again to less than six cents a pound.

Since 1920 the sugar frontier has continued to move onto the poorer lands of eastern Cuba (Map 131). In 1939, only 20 per cent of the total crop was raised in the provinces of Habana and Matanzas; 22 per cent was raised in Santa Clara; 25 per cent was raised in Camagüey; and 29 per cent was raised in Oriente. Meanwhile the price of raw sugar in New York has continued to decline, in 1939 dropping to less than two cents a pound wholesale. Cuba's share of the market in the United States is now determined by a quota. In 1940, Cuba was assigned a quota of 64.41

MAP 131

per cent of the requirements; but the beet-sugar growers as well as the Louisiana cane growers bring constant pressure on Congress to reduce the Cuban quota, and Cuba, being independent, has no voice in the decision.

This eastward movement of the sugar frontier, whereby lands which in general are more permanently productive are abandoned for lands which after a few years will become much less productive, makes it more and more difficult to maintain the low cost of production for which Cuba has been famous. The average yield per acre in Cuba is declining. If intensive methods, involving greater application of capital and labor, were adopted, the yield per acre would again increase and the cost of producing each unit of sugar might still be lowered; but this change would involve concentration on the better lands, and as long as an abundance of free land, whether better or poorer, makes the continued expansion of the hollow frontier possible, there seems little chance of intensification. Additional investment would not justify itself on the poorer lands; but the increased productivity on the deep red soils of the limestone districts would amply repay the use of more intensive methods (265).

Two chief facts account for the failure of the Cuban sugar industry to show, even with the low prices of the present period, any tendency toward an abandonment of the poorer lands and a concentration with more intensive methods on the better lands. First is the unwillingness of most Latin Americans to invest their funds in commercial production. A Latin would be more inclined to spend his money for the construction of a beautiful home, for education, or for European travel, than to invest it in his business. His attitude toward the land, and toward the commercial production from land, is quite different from that of the average Anglo-American. But his traditional attitude is beginning to change—rapidly in those places where the urban-industrial way of living is making its chief impact. In Habana, in close contact with the United States, the wealthy Cuban is at least exposed to the different ideas on these matters entertained on the North American mainland.

The second reason for the lack of a move toward more intensive production is that the Cuban quota in the sugar market in the United States is, as we have said, definitely restricted; and even the amount of the quota is subject to attack at frequent intervals by the politically powerful sugar interests in the United States. Against the benefits to be derived by them from a reduction of the Cuban quota, the fact that the consumers must pay a higher price to support a relatively expensive method of production has little weight—even with the inefficient methods Cuba's

costs are considerably less than are the costs in the United States of producing sugar either from beets, or from green cane in Louisiana (289).

Cuban Tobacco

Cuba is distinctly a one-crop country. Sugar is much more important to Cuba than coffee is to Brazil. In 1939 sugar and sugar products accounted for 78 per cent of the exports. In spite of the variety of kinds of land in Cuba, each well suited to many different kinds of agricultural production, no sign of crop diversification has yet made its appearance, despite the fact that for years experts have been recommending such diversification.

There is one other commercial crop, however, for which Cuba has long been famous. That is tobacco. It was in Cuba that the Spaniards first made the acquaintance of this plant and its use. The manufacture and smoking of cigars was taught to the Occidental world by the Indians of America; Cuba was a country of tobacco and cigar production before the arrival of Columbus. Cuba is still the source of some of the world's finest tobaccos.

About half of the Cuban tobacco is grown in the so-called *Vuelta Abajo* district, located south of the Sierra de los Órganos on the better-drained upper part of the coastal plain in Pinar del Río (Map 131). Here the soil is sandy and generally infertile, but possesses a physical structure which permits the maximum benefit to the plants from the use of fertilizer. The young tobacco plants are usually set out in October, and the first leaves are ready to be cut in January. The crop is grown on small properties which average only about forty acres, but the work of cultivating, harvesting, and curing the crop is so great that on each forty-acre estate the services of at least twenty men are required. Tobacco for use as cigar fillers is grown without shade, but the tobacco destined for use in cigar wrappers must be grown under cheesecloth, and must be carefully protected from insect pests, and handled in such a way that the leaf is not torn or damaged.

The Vuelta Abajo district is a relatively small area of intensive production and concentrated rural population. It forms a strip along the piedmont of the Sierra de los Órganos which is about ninety miles long, but not much more than ten miles wide.

There are two other areas of tobacco production in Cuba. The *Partito* district, near Habana, although much smaller than the Vuelta Abajo district, produces tobacco of nearly equal quality. The *Vuelta Arriba*

district, in the province of Santa Clara, also a small area, grows tobacco of inferior quality on a variety of soils.

Habana

All the various activities we have described come to a focus on Habana, the capital of Cuba. With a present population of over 500,000, Habana has spread far beyond the outlines of the little Spanish colonial town. The fortress which long guarded the northern approach to the Spanish Gulf of Mexico still stands at the entrance to the bay. The downtown section of the city is laid out with the usual narrow streets on a rectangular plan, built around a central plaza. The residential suburbs are among the most beautiful of tropical America.

Habana is supported by other activities than those related to commerce and government. One important manufacturing industry is the production of cigars and cigarettes. Although an especially high tariff imposed by the United States on imported cigars caused many of the Cuban factories to move to Tampa, Florida, factories in Habana still export cigars to other parts of the world.

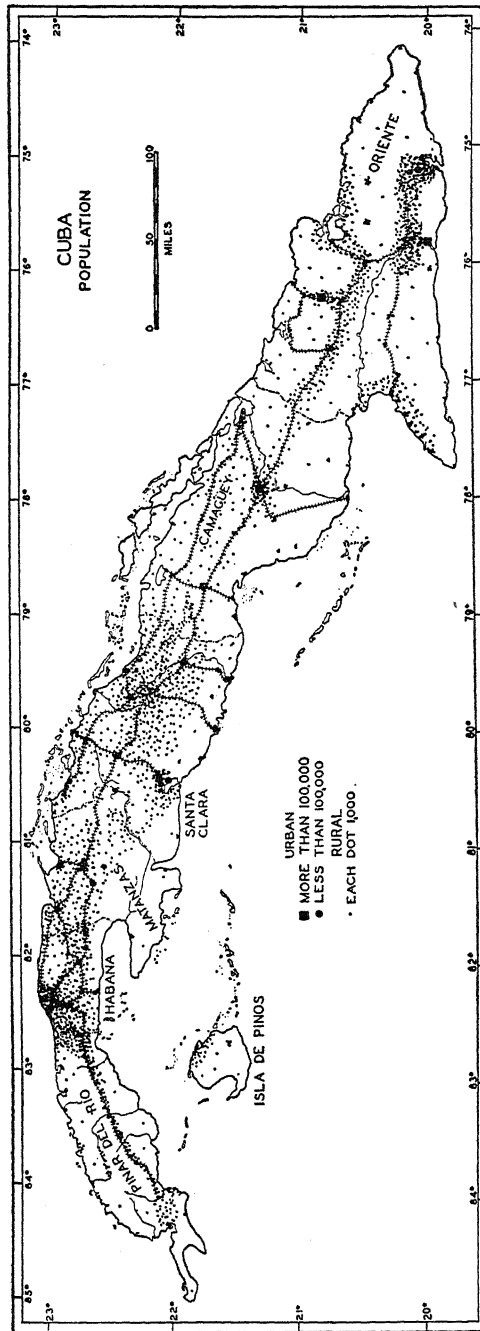
Habana derives a considerable prosperity from the tourist business, especially during the winter months. North Americans can perhaps qualify as the world's chief travelers; and to whatever country they go for rest and recreation they constitute an important source of income. The desire to escape from the unpleasant winters of the north leads a larger and larger number of people toward Florida and Cuba. Any increase in the general level of prosperity in the United States—or a war which bars travel in Europe—turns increased numbers to these southern resorts, and contributes a form of speculative prosperity to the urban dwellers of Habana.

CUBA AS A POLITICAL UNIT

Cuba is still a land of low population density—much lower than that of the other great sugar-producing island, Java. In 1909 there were approximately 2,898,000 people in Cuba, over a million of whom were urban people, living in eleven cities, for Cuba is still a country with a relatively high proportion of urban people. The population in 1936 was estimated at a little over 4,000,000. Four cities which have passed 100,000 in population are Habana, Camagüey, Holguín, and Santiago de Cuba—the latter three all in the eastern part of the country. With so small a proportion of the land used for crops, but with some 52 per cent of the

country considered to be potential cropland, there is still ample room for the expansion of settlement to new areas, or for the increase of the population density in the areas already settled. A larger proportion of the people of Cuba are directly engaged in activities leading to the production of commodities which enter into foreign commerce than is the case in most other Latin-American countries.

Map 132

Cuba's chief export is sugar and sugar products. In 1939 these items combined to make up 78 per cent of the value of all exports. In addition there were a number of lesser items. The tobacco exports amounted to about 9 per cent of the total. Although small in value in relation to sugar, Cuba's mines of chromium and manganese, located in the eastern mountain regions, are of strategic importance to the United States which has no domestic sources of these minerals. In 1939 the Cubans supplied 16 per cent of the chromium and 2 per cent

of the manganese used in the United States, and also a small quantity of iron and copper. Banana plantations, located in the east near Guantánamo, and in the west beyond the Vuelta Abajo tobacco district, also supplied some exports.

The United States dominates Cuban commerce. In 1939 the United States took 75 per cent of the exports, and the United Kingdom took 12 per cent. Germany was well down the list with only 1 per cent. Of the imports, the United States supplied 74 per cent, and Germany and the United Kingdom about 3 per cent each. Cuba sends to and buys from a large number of the countries of the world, but in comparison with the trade with the United States, the value of these other connections is small.

Cuba is essentially an economic dependency of the United States. Geographic proximity, which has become of such great importance in the modern period, was of little significance before the people of the United States had settled the land and exploited the resources available within their own continental territory. When considerable numbers of people with money to invest in profitable enterprises began to look beyond the national borders, Cuba was one of the first places they saw. Cuba's position at the threshold of the world's largest sugar market has brought to this nearest of the Latin-American republics a very definite rise in material prosperity, a quickening of the tempo of economic activity; but, in the process, Cuba has lost, or failed ever to gain, a large measure of economic independence.

29

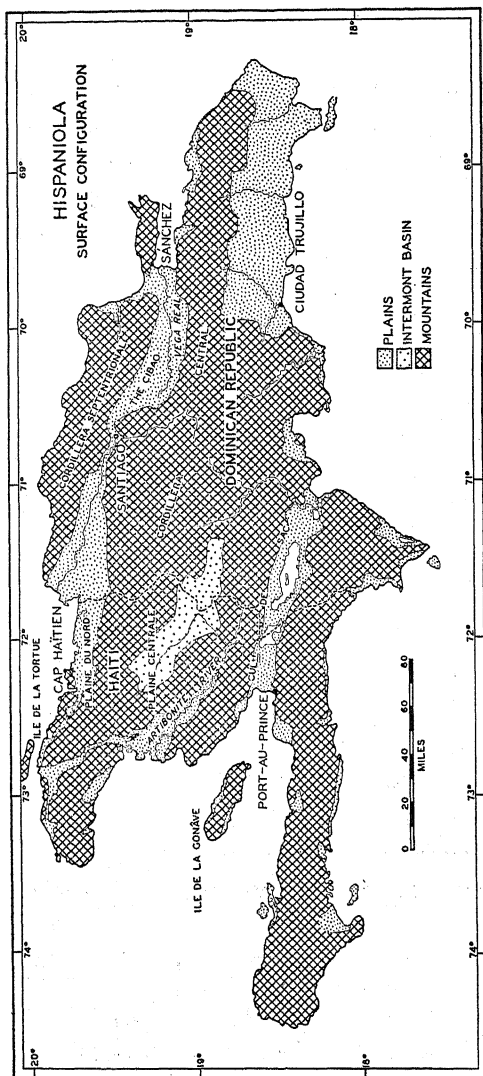
REPÚBLICA DOMINICANA — RÉPUBLIQUE D'HAITI

	República Dominicana	République d'Haiti
Total Area	19,325 square miles	10,700 square miles
Total Population	1,655,779	3,000,000
Capital City	Ciudad Trujillo Population, 71,297	Port-au-Prince Population, 125,000
Trade per Capita	Imports: $7.17 Exports: $9.45	Imports: $2.53 Exports: $2.32
Unit of Currency	Dollar ($1.69, gold content value)	Gourde ($.20, gold content value)
Major Commercial Products	Sugar, Cacao, Coffee, Molasses, Tobacco, Maize, Gold	Coffee, Cotton, Sugar, Sisal, Bananas, Cacao, Molasses, Goatskins, Cottonseed cake, Logwood
Railroad Mileage	412	158

(The above statistics are for the year 1938.)

29

THE DOMINICAN REPUBLIC AND HAITI

THE VARIETY of lands and of peoples and the sharp contrasts in the economic life within small geographical areas which we have learned to look for as an outstanding characteristic of Latin America are illustrated in still another striking manner on the island of Hispaniola. Here two independent states are locked within the narrow confines of a single island. In the west is Haiti—Negro in race, Negro in the manner of living in spite of a superficial French tradition and in spite of the use of the French language; and in the east is the Dominican Republic—mostly mulatto, but essentially Spanish in the way of living. The western one-third of Hispaniola is occupied by some three million Haitians, with a density of 280 people per square mile; the eastern two-thirds is occupied by only a little over a million and a half Dominicans, with a density of 77 per square mile. On one side of the border between these two countries there are small farms, cultivated with the hoe, and producing chiefly subsistence crops; on the other side are large estates devoted to cattle or commercial crops, and on these estates the majority of landless tenants and wage workers labor for the minority of aristocratic owners. On one side, the way of living is fundamentally African; on the other, the economic, social, and political life proceeds in accordance with the Spanish tradition. And the presence of two such contrasted peoples, politically separate, within so small an area, is not without its elements of danger.

MAP 133

coast, extending from the east coast of Hispaniola northwestward to the north coast. This lowland is known as the *Cibao* in the Dominican Republic, and as the *Plaine du Nord* in Haiti.

The Cul de Sac lowland, previously mentioned, is a deep structural depression, the bottom of which lies about 150 feet below sea level. The depression extends from the west coast in Haiti to the south coast in the Dominican Republic, and on its bottom are two shallow lakes. At the western end of the Cul de Sac, nestled against the southern range on the southern side of the lowland, is Port-au-Prince, the capital of Haiti.

Along the west coast of Haiti there is another low plain which extends, wedge-like, from the coast southeastward into the midst of the mountain ridges. This is the *Artibonite Lowland*, which lies wholly within Haiti. At a much higher elevation is the basin just to the south of the Cordillera Central astride the boundary between Haiti and the Dominican Republic, which the Haitians call the *Plaine Centrale*. In the western part, the Plaine Centrale, standing some thousand feet above sea level, has been cut by numerous steep-sided ravines along the headwaters of the Artibonite River, leaving broad and gently rounded interfluves between the ravines; in the east, the floor of the basin slopes gradually toward the southern coast of the Dominican Republic, and in

this section it has been so deeply dissected by many short streams that its surface must be classified as mountainous (Map 133).

In addition to these intricately arranged mountain axes and structural depressions, the surface of Hispaniola is further complicated by many small isolated mountain blocks, and by many miniature valley lowlands and sea-border plains. Geologically associated with the surface features of the main island, too, are the bordering smaller islands of Gonâve, off the west coast, and Tortue off the north coast.

Climate and Vegetation

A surface so complex in its pattern of slopes and basins could not fail to develop a complex pattern of climatic conditions and vegetation. The temperatures generally decrease with increasing elevation, but there are many protected pockets which are so disposed that the heating effect of the sun is especially great, and in which exceptionally high temperatures are to be observed. Port-au-Prince itself, located not only on the protected western side of Hispaniola but also in the embrace of minor spurs from the southern mountains, has one of the highest average temperatures of any major city in the West Indies.

The pattern of rainfall is also very complicated. The north- and east-facing slopes of the mountains are generally wetter than the south- and west-facing slopes, although this generalization does not apply to the southern mountains of Haiti where both north and south slopes are wet. Among the lowlands, the Cibao receives abundant moisture, especially in its eastern part, where there is a district of great agricultural productivity known as the *Vega Real*. The Plaine du Nord of Haiti receives somewhat less moisture than its eastern continuation in the Dominican Republic. The coastal plain in the southeast, on which Ciudad Trujillo is situated, receives barely enough for crop production without irrigation, and in this area most of the sugar-cane plantations are now irrigated. The Plaine Centrale of Haiti is also near the margins between humid and subhumid. But the Artibonite Lowland and the Cul de Sac are both semiarid.

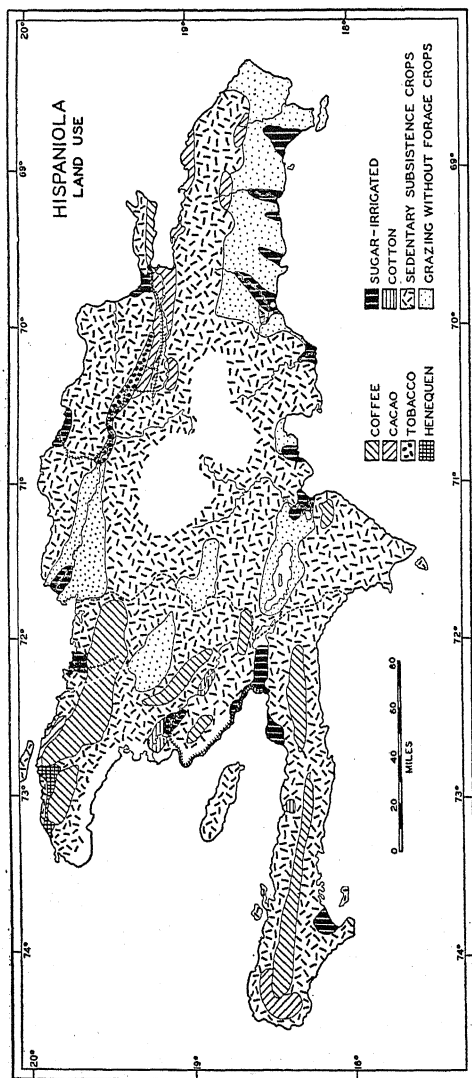
The fact that moisture deficiency cannot be defined in terms of the annual amount of rainfall without reference to such other factors as the rate of evaporation is well illustrated by the conditions at Port-au-Prince. At this station, 54 inches of rain are not quite sufficient to permit the growth of sugar cane without irrigation, nor does this amount of moisture support a vegetation cover more luxuriant than a deciduous thorny scrub

forest mixed with giant cacti. An average annual rainfall of less than 50 inches in the Cul de Sac produces conditions which are definitely semi-arid. The evaporation which takes place where the temperatures average over 80° is very great; and where evaporation is rapid, more rain must fall in order to support humid vegetation, or to make possible the practice of humid-land agriculture.

The natural vegetation of Hispaniola closely reflects these conditions of climate and surface. The wetter places were originally clothed with a dense rain forest, but the drier slopes and basins supported only a thorny scrub forest which varied in density in accordance with the variations in the conditions of drainage. The drier northwestern part of the Plaine Centrale was covered with an open savanna, with trees only in the narrow, wet ravines; but the wetter southeastern part supported a dense scrub forest. Only in the Cordillera Central are the elevations sufficient to reach the zone of the pines.

Such is the nature of the island of Hispaniola. This is the land now occupied by two strongly contrasted peoples, whose traditions, whose technical abilities, whose basic attitudes are so different that the political boundary which divides Hispaniola into two parts has become a sharp culture boundary as well.

THE DOMINICAN REPUBLIC

The Spanish-speaking people of the Dominican Republic occupy the eastern two-thirds of Hispaniola. The figure of population density (77 per square mile), derived from dividing the total population by the total national territory, is entirely misleading, for actually the Dominicans are concentrated in certain areas only, and large parts of the republic lie outside the effective national territory. There are two areas of concentrated settlement: one in the south around Ciudad Trujillo; the other in the north, in the lowland of the Cibao. The small number of inhabitants, the small size of the communities, and the separation of the two chief areas of settlement by the steep slopes of the Cordillera Central have greatly increased the difficulties to be faced in the struggle against the forces of chaos and disorder. The Dominicans had a long record of internal conflict, with frequent intervention from outside, which culminated in a military occupation by the United States marines from 1916 to 1934. When the marines departed they left the government of the country in the hands of a strong ruler, President Trujillo, who has been able since to maintain order through the operation of centralized authority.

MAP 134

to which the corruption of public officials had gone is revealed by the fact that when, early in the present century, the United States undertook to collect the customs, agreeing to give 45 per cent of the revenue to the government and to keep 55 per cent for the repayment of debts, the 45 per cent thus collected for the local treasury was greater than the whole government revenue of any preceding year (4).

Meanwhile, in the midst of all this confusion, certain economic advances were being made. In 1888, the export of cacao began from plantations in the eastern part of the Cibao, in the Vega Real district. During the next twenty years commercial production included also sugar cane, coffee, cotton, tobacco, beeswax, and honey. In 1914 sugar passed cacao as the leading export. In part, these developments were due to a small, but significant immigration of Cubans, who introduced new sugar-planting techniques, and also to the arrival of a group of North American Negroes who settled near the port of Sánchez on the margins of the Vega Real. Still the Dominican Republic had only two short public railroads, and its highways were all but impassable. Only trails led across the wilderness of the Cordillera Central.

The occupation by the United States marines was brought about,

during the First World War, by the necessity of securing the approaches to the Panama Canal, the keystone of national defense. There can be no doubt that a weak government faced with almost constant domestic troubles, and in possession of an island so strategically placed, constituted a potential menace. In 1916, therefore, the marines landed at Santo Domingo, and soon brought the whole territory under their control. Order and security were established, roads and railroads were constructed, and a considerable gain in commercial production was effected. The rate of population increase, too, showed a marked upturn.

North American sentiment opposed to such foreign occupation regained enough power after the war to bring about the evacuation of the Dominican Republic in 1934. The reorganization of the finances and the construction of good roads, however, have had a lasting effect on the country as a whole.

Unfortunately the people of this little republic are beset by hazards other than those of political disorder. On September 3, 1930, a disastrous hurricane swept over the eastern end of Hispaniola, resulting in the complete destruction of the capital city of Santo Domingo. Of some ten thousand buildings which had formed the city, not more than four hundred were left standing. President Trujillo had the capital rebuilt, and the new city was named Ciudad Trujillo.

Present Distribution of People

About half of the present population of the Dominican Republic occupies the lowland of the Cibao. The chief concentration of settlement is in the district around Santiago, second city of the republic; well-populated country extends westward toward the Haitian border, and eastward to the port of Sánchez. In the modern period this is a region of small farmers, although for a long time the problem of land tenure was complicated by the operation of the large inherited estates by all the heirs in common. Now that these colonial properties have been divided up into small parcels the rural people have settled on their own small farms, with a notable increase of stability. The largest part of the crop acreage is devoted to maize, manioc, and other purely subsistence crops, but there is a small surplus of maize and tapioca produced in this area for export. The leading commercial crops are cacao and tobacco. Cacao is grown in the lowland of the Vega Real and on the southern shore of the bay on which Sánchez is located; tobacco is grown principally in a belt along the base of the Cordillera Septentrional, chiefly to the east of

Santiago. The drier western part of the Cibao, covered with savannas, is used for cattle and goats, and for bee culture. The Dominican Republic has developed from this area, and from some others scattered throughout the country, a small but steady export of honey and beeswax.

The other chief concentration of rural settlement is on the southern coastal plain, mostly to the east of Ciudad Trujillo. This is the largest area of sugar-cane planting carried on with irrigation. To a much greater extent than in the Cibao, the major effort in agricultural production on this southern coastal plain is put into one commercial crop, with a minimum of attention to subsistence crops. The sugar cane is grown by a few large landowners, and by many associated small farmers and tenants.

Most of the remainder of the Dominican territory is divided into huge private estates, and the population is very sparse. It is not surprising, therefore, that the Dominican Republic was the first country in the Western Hemisphere to make a definite offer of land for the settlement of European refugees. President Trujillo turned over a part of his own private estates for this purpose, and the republic plans now to provide farms for 100,000 refugees, mostly Spanish and German Jews. In 1940 some 300 colonists had been placed on farms aggregating 750 acres, but one thousand more settlers were expected in 1941.

THE DOMINICAN REPUBLIC AS A POLITICAL UNIT

The export trade of the Dominican Republic is becoming increasingly important. Sugar is by far the leading item, making up 63 per cent of the total exports in 1939. Cacao and coffee are the next two in order of value; after them come a variety of small items, many of which are derived from the small farms of the Cibao—items such as tapioca, tobacco, maize, cattle, and bananas. The United Kingdom was first in 1939 in the exports of the Dominican Republic, taking 36 per cent as compared with 27 per cent to the United States and 11 per cent to France. The United States supplied 52 per cent of the imports and Japan supplied 12 per cent.

The Dominican Republic faces difficult problems not only in building up its internal order, but also in its relations with neighboring Haiti. Only the barrier imposed by a political boundary serves to restrict the expansion of the crowded population of Haiti eastward over the thinly populated eastern part of Hispaniola (Map 135); and in spite of treaties between the two countries there are frequent border troubles arising from the illegal movement of Haitians into Dominican territory. It is esti-

mated that some 300,000 Haitians have filtered into Dominican territory, where there is a deficiency of field hands, especially at the time of the sugar harvest. So fearful have the Dominicans become regarding the results of this leakage, that in 1937 they massacred about 10,000 Haitians near the border. Unless a sufficient population pressure can be built up in the Dominican Republic to resist this pressure from the west, it is a question of how long the artificial barriers can hold. It is no wonder, therefore, that the Dominicans have been very anxious to secure immigrant colonists. The question remains to be answered, however, whether or not the Dominicans have achieved sufficient stability and political coherence to permit them to build an effective national economy.

HAITI

In Haiti three million people are crowded into a territory approximately the size of New Jersey. Not less than 95 per cent of them are pure-blooded Negroes; but the 5 per cent which is mulatto, inheriting some white blood from the French planters who once owned this part of Hispaniola, make up now the small group of Haitians who dominate the politics of the country and occupy the positions of chief social prestige. Haiti is the twentieth of the independent republics of Latin America which we have to consider: it stands in complete contrast to all the nineteen other political units; its culture is no more Latin than is that of the highland Indian communities of Middle and South America. Haiti, with its essentially African society, adds further contrast to that colorful kaleidoscope of sovereign peoples brought together at Pan American gatherings.

SEQUENCE OF SETTLEMENT

The first settlers to make use of the western side of the island of Hispaniola were English and French pirates. About 1625 the Île de la Tortue (Tortuga) became one of the chief pirate strongholds of the West Indies. Bands from this base would come over to Hispaniola to hunt the wild cattle and hogs which had escaped from the Spanish settlements in the east. Large fires were built, and over these the carcasses, laid on grills (*boucans*), were processed for tallow. Here in the hills of Haiti, the pirates came to be known as *boucaniers*, or buccaneers. In the course of time the French drove out the English, and, supported from French colonies on other near-by islands, they established settlements on Haiti, especially along the northern coast. In spite of repeated attempts, the

Spaniards of eastern Hispaniola could not drive them out, and in 1697 Spain recognized France's claim to the western third of Hispaniola. The new French colony, now officially established, was known as *Sainte Domingue.*

The French Period

The century of French ownership witnessed the rise of Sainte Domingue to the status of one of the world's richest colonies—almost equal to Java as a producer of revenue for the home government. In those days, when the West Indies were producing sugar for Europe's growing markets, colonies were far from being a financial liability. The destructive exploitation of land, together with the use of slave labor, could be made, for a time at least, to yield enormous profits for the owners. Colonies today cannot be ravaged for profit in an eighteenth- or nineteenth-century manner without the knowledge not only of the home country, but also of the rest of the world, for the movie news reels and the illustrated magazines quickly spread the story, if there is a story to be spread.

The settlement of Haiti by the French sugar planters was concentrated on the lowlands. The first district to be developed was on the Plaine du Nord, in the territory served by Cap Haïtien, then known as Cap Français. The fertile plain was divided into a rectangular pattern of well-kept roads and large properties, all neatly bordered by hedges. The mansions of the planters were luxurious, and the prosperity of the colony became famous. Seeking more space, the French extended their plantations southward to the other two lowlands, the Artibonite and the Cul de Sac. In 1749 the town of Port-au-Prince was laid out, and in 1770 it was made the seat of government in place of Cap Français.

The shift of the center of French authority to the south was in part a result of the enormous productivity of the Cul de Sac. With the aid of their slaves the French built elaborate systems of irrigation, including long stone aqueducts, some of which are still in use. Because of the larger amount of sunshine received where the rainfall is not so heavy, these dry plains, once their moisture deficiency was remedied by irrigation, proved to be better producers of sugar than the Plaine du Nord. Soon the Cul de Sac had become the chief center of sugar planting.

As the prosperity of the colony grew, other commercial crops were added. In the lowlands, indigo was grown along with the sugar cane. Smaller areas were devoted to bananas, yams, manioc, cacao, coconuts, and cotton. Late in the French period, coffee was introduced, and several

important plantations were developed, especially on the slopes of the Cordillera Central south of the Plaine du Nord.

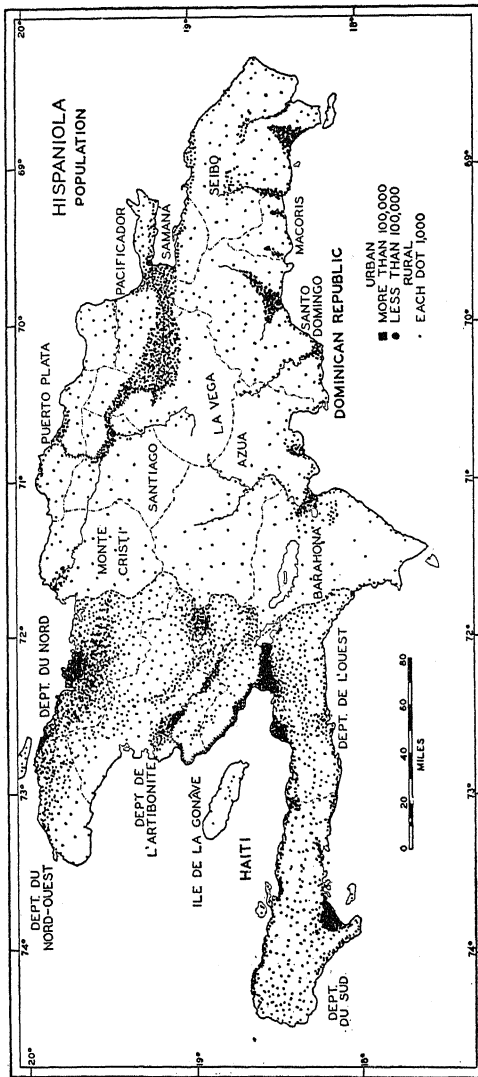
Meanwhile the social situation in Sainte Domingue was becoming explosive. The Negroes greatly outnumbered the whites, but this condition might not have led to disastrous revolts had it not been for the mulatto class. The mulattoes, made free by a decree of the French government but not accepted on terms of equality by either the pure blacks or the pure whites, became more and more a source of unrest. In the meantime, Sainte Domingue and the sleepy Spanish colonies of eastern Hispaniola had developed along very different lines and the contrasts in the racial make-up of their settlers had become very great. The figures for the Spanish and the French parts of Hispaniola near the end of the eighteenth century illustrate the difference between the two (4):

Population of Hispaniola

Colony	*Year*	*White*	*Free Negroes and Mulattoes*	*Slaves*
Spanish	1794	35,000	38,000	30,000
French	1789	30,826	27,548	465,429

Period of Independence

The liberal political doctrines of the French Revolution had a very special meaning for the mulattoes of Sainte Domingue, many of whom had been sent to Paris for an education. Talk of freedom and equality, together with considerable political disorder in Sainte Domingue, led step by step to a revolt of the Negroes, the destruction of the estates, and the hurried escape of such white landowners as were able to avoid death at the hands of their former slaves. In 1804 the Negroes of Hispaniola declared their independence and adopted the Indian name of the island, Haiti. The blacks also invaded eastern Hispaniola and brought the whole island under their rule. The eastern part, as we have said, did not become the independent Dominican Republic until 1844.

The period of independence in Haiti resulted in a number of changes in the relation of the people to the land. The breakdown of the systems of irrigation because of the lack of strong central authority made most of the lowlands uninhabitable for an agricultural people. The result was a marked decrease in population in these areas, except in the wet Plaine du Nord. Great numbers of the Haitians withdrew to the mountain regions, or to the southeastern part of the Plaine Central. The former

Map 135

slaves established themselves on small properties on which, with African agricultural techniques, they raised their own supplies of food. Production of sugar for export practically ceased, but the export of coffee was continued. The carefully cultivated plantations of the French were given no attention except at harvest time, and new coffee trees planted on the steep mountain slopes were allowed to grow as wild trees of the forest, entirely without care. Yet the coffee produced in this manner in Haiti proved to possess such an excellent aroma that it commanded a special place on the French market, and is to this day one of the highest-priced coffees in the world. Haitian coffee, mixed with the coffees of Brazil, together with much chicory, gives distinctive flavor to the coffee served in France.

These changes in the distribution of people and in their form of economy produced some interesting changes in the Haitian landscape which can still be observed. Today the French aqueducts, the mansions of the sugar planters, the old stone sugar mills, and many old churches, remain only as ruins. The old rectangular field patterns, dear to the hearts of the Frenchmen, have also disappeared under the haphazard and irregular trails and fields of the carefree Negroes. But the old rectangular French patterns have not been entirely lost; from the ground they are

no longer visible, but from the air one can still observe the faint trace of straight lines crossing at right angles. One result of the overlap of patterns is the utter confusion of land titles.

The way of living in rural Haiti today is essentially African. There are many forms of entertainment and of religious expression the origins of which can be traced to the original homeland of the Negroes. Voodooism is the basic religion of the masses. The markets which are held throughout rural Haiti, many of them in the open country, are attended primarily for social pleasure, not for buying and selling. The everyday life of the rural Haitian is made up of a strange mixture of African traits and French traits, with the African ones the more fundamental (272).

The average rural Haitian is not a person of great ambition, nor one who takes naturally to the complexities of commercial life. Compared with the way of living on a plantation in the French period, the way of living of the rural Haitian since independence is simple indeed. Only those things necessary to satisfy the fewest wants are produced, and since the soils of the wetter parts of Haiti continue to yield abundant crops there is no need for great exertion. The attitude toward the land and toward the use of land is essentially African. Land ownership itself does not give prestige to the owner, and there is no urge to sell a surplus of things for profit. In many parts of Haiti there are co-operative agricultural societies organized to work the farms of the members collectively, and to afford the members protection or assistance in the case of accident. Although the land is cleared with the machete and cultivated with the hoe, yet the Negroes are excellent farmers, and their small gardens are made to yield an extraordinary variety of crops with the expenditure, on the part of each individual, of a minimum of labor.

Unfortunately, however, not all the people of independent Haiti are lacking in personal ambition and in the desire for power and prestige. Especially do the mulattoes, who, as we have said, often had the advantages of education in Paris, take a keen interest in politics. In the course of time the government was effectively concentrated in the hands of not more than three hundred mulatto families, and the majority of the former slaves found that they had new masters who also expected to be obeyed.

The political factions which developed brought chaos to Haiti. Each group in turn, as it came to power, raided the public treasury, and political corruption brought the country to financial ruin. Insecurity in the rural districts was a result not only of banditry, but also of the system of recruiting for the army—for an army had to be maintained to keep a political faction in power after it had been successful in seizing that

power, and other armies had to be recruited to carry on a successful revolt. The able-bodied men were "conscripted" wherever they could be found. As a result, the men feared to venture forth on the trails, and attendance at the markets was largely restricted to the women. Hall reports that there is little use in asking directions in rural Haiti from the men—only the women have traveled enough to know where the trails lead.

North American Occupation

From 1915 to 1934 Haiti was occupied by the United States marines. Troops were originally landed the year before the occupation of the Dominican Republic began because the chaotic internal conditions in Haiti were considered a menace to the security of the United States. In spite of great material improvements which have resulted from the return of domestic tranquillity, the occupation has been condemned by people in most of the countries of Latin America as an infringement of the rights of an independent state. It is pointed out that one result of the occupation was the repeal of the Haitian law which prohibited the ownership of land by foreigners, thus leaving the way open to the establishment of large commercial plantations owned by companies in North America. Without attempting to pass judgment on so complex a question, we may nevertheless ask ourselves whether the material and financial gains in Haiti are worth the ill feeling toward the United States engendered throughout Latin America. We do know that the withdrawal of the troops from Haiti in 1934 was followed by the development of a considerably more friendly attitude toward the United States among our southern neighbors.

The idea that Haiti should solve its problems by increasing its commercial productivity was promoted by North Americans backed by technical advice and by dollars to invest. The chief commercial product of the country since the beginning of the period of independence has been coffee, but since the later years of the North American occupation, the proportion of coffee among the exports has been greatly decreased through the addition of other items. Two North American sugar companies started operations along the southern side of the Cul de Sac lowland, which has once again become an important area of sugar production and once again supports a dense population (Maps 134 and 135). In 1930 Haiti had no commercial plantations of bananas: in 1940 Haiti produced 3,000,000 bunches of bananas, all from small farms, all mar-

keted through the facilities of the Standard Fruit Company, a North American enterprise. In addition to sugar and bananas, other crops now produced commercially include cotton, sisal, and cacao. Among a number of new products recommended, and now being actively promoted by the Haitian government with the aid of North American capital, are vegetable oils, limes and other tropical fruits, coconuts, rubber, and insecticidal roots. The problem of soil erosion on some of the steep slopes where logwood-cutting and charcoal-making have led to a rapid deforestation is being attacked by a program of reforestation, making use of such commercially valuable species as bamboo, teak, tung, and mahogany.

Present Distribution of People

Better hygiene, the rise in the general level of prosperity and security, the increase in the areas sufficiently productive to support dense settlement—all these things have led to a rapid increase in the rate of population growth. Starting its independent existence with fewer than 500,000 inhabitants, Haiti's population reached 2,000,000 during the 1920's, and in 1936 was estimated to have reached 3,000,000. The beneficial effects anticipated from the material improvements must, therefore, be spread over so many more people that the problems of poverty and food supply are even more serious than before—one result of the North American occupation that was not foreseen.

No part of Haiti can be described as thinly populated (Map 135). To be sure, the islands of Tortue and Gonâve, the southern part of the northern peninsula, and the coastal fringe of the Artibonite plain have a relatively small population; but to a remarkable degree in so mountainous a country, the Haitians are widely scattered over the whole national territory. In a few of the lowlands and basins distinct zones of especially dense concentration appeared during the North American occupation. The greatest density of all is to be found in the sugar-cane lands of the Cul de Sac around Port-au-Prince. Some of the sea-border plains of the southern peninsula have densities which are almost as great as those of the Cul de Sac. Another concentration appears in the southern and wetter part of the Plaine Centrale. Still another such zone is found on the Plaine du Nord around Cap Haïtien, and this zone of concentrated settlement also extends southward onto the slopes of the bordering mountains. In fact, the mountains south of the Plaine du Nord have the greatest density of population of any of the mountains of Haiti.

All along the political boundary which separates Haiti from the Dominican Republic, however, the crowded communities of Haitians face a country beyond, which is only thinly populated.

HAITI AS A POLITICAL UNIT

The close ties which once connected Haiti with France, and which persisted throughout most of the nineteenth and early twentieth centuries, have now been weakened. These ties are both cultural and commercial. Fewer students now seek an education in Paris and more and more come to the United States—a trend which has, of course, been greatly accelerated by the outbreak of the Second World War. In the commercial field, coffee has been the product which tied Haiti to France, and as the ratio of the value of coffee exports to all exports decreases the ratio of Haiti's trade with France decreases. In 1939 the United States took 34 per cent of the exports of Haiti, France took 21 per cent, the United Kingdom took 19 per cent, and Belgium took 10 per cent. The United States, however, supplied 62 per cent of the imports to Haiti, and the United Kingdom, 11 per cent. The leading item of export is still coffee—still a little more than half of the total in 1938, and 1 per cent of the coffee exports of all Latin America. But now cotton, sugar, sisal, bananas, and cacao diversify and help to stabilize Haiti's trade.

Haiti may be on the threshold of a great development of commercial production. Its varied terrain offers conditions suitable for a wide variety of tropical crops; but of greater importance even than varied terrain is the relatively dense population of effective workers. The fact is that Haiti offers to the commercial world an opportunity for cheap agricultural production unequalled in the Western Hemisphere. Whereas in the British colonies of Jamaica and Trinidad wages are between thirty-five and forty cents a day, and in Puerto Rico vary from eighty cents to a dollar, a laborer in Haiti receives only between ten and thirty cents a day. Yet the Haitian worker is described as "having the appearance of good physical condition" and "showing few signs of nutritional deficiencies" such as are so common among the poorer classes in the Spanish- and Portuguese-speaking countries.[1] Here, then, is a part of the Western Hemisphere in which some hope of success might be anticipated in the low cost production of tropical plantation crops requiring

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[1] From a recent agricultural report by Mr. Atherton Lee, Director of the Experiment Station, Mayagüez, Puerto Rico. The report was published in *Foreign Agriculture*, by the U. S. Department of Agriculture.

large amounts of labor. Few parts of Latin America are occupied by a sufficient number of people for a large plantation development. Haiti is considered at present to be one of the most favorable places in the Western Hemisphere for the location of plantations of rubber. It is no wonder that pressure was brought on the Haitians to repeal the law which prohibited land holdings by foreign companies.

Haiti's dense and rapidly growing population, therefore, may prove to be an economic resource, or it may prove to constitute a serious social and political problem. In another geographical position, Haiti could take its place among the four areas of expanding settlement in Latin America previously described. But beyond the gradual increase in the density of settlement, or the advance of internal frontiers such as those produced by the development of irrigation systems on the scantily occupied dry plains, the Haitians have little chance to expand. Emigration to Cuba would become a major migration were it not for Cuban restrictions. On Hispaniola, expansion toward the east is supposed to stop at the arbitrary political boundary—arbitrary in the sense that it conforms to no natural barrier. Compelled to remain within Haitian national territory, the Haitians might develop a density of population which would become explosive.

The distribution of people on the island of Hispaniola is potentially unstable. The sugar planters of the Dominican Republic are in need of more workers during the harvest season; but the admission of any important number of Haitians, who will work harder and more effectively for less pay than the Dominicans are willing to do, would inevitably result in flooding the eastern part of Hispaniola with Negro immigrants. Once the border should be breached there is no predicting where the movement might stop. The Dominicans are indeed fortunate that the great majority of the Haitians are peace-loving, and not filled with ambitions of conquest. But ideas of conquest and of the right to take space from people who are not using it effectively are abroad in the world today, and the small group of alert people who control the government of Haiti are in close touch with the currents of thought outside their little country. Although the Haitians, since the withdrawal of the United States marines, have been able to maintain a coherent and orderly state, the situation on the island of Hispaniola is not without peril.

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POSSESSIONS OF THE UNITED STATES IN THE WEST INDIES

THE LATEST of the "great powers" to acquire possessions in the West Indies has been the United States. For although this country refused to make permanent its military occupation of Haiti and the Dominican Republic, it did adopt Spain's last remaining colony in the Western Hemisphere as a by-product of the war for the liberation of Cuba. Puerto Rico was made a territory of the United States at the conclusion of that war, and so has become the one truly Latin-American possession of the "colossus of the north."

PUERTO RICO

Puerto Rico is one of the few places in the West Indies in which the Negroes are not increasing more rapidly than the white people. In 1802 Negroes made up 52 per cent of the population of Puerto Rico, but by 1920 the proportion had dropped to only 27 per cent. This trend had started before the colony was taken from Spain, but since the beginning of the period of possession by the United States the rate of population increase has grown enormously, and in this process the Negro seems to be on the way to absorption.

The transfer to the United States brought profound changes to Puerto Rico, including a reorientation of its economic life, yet the basic problems inherited from the Spanish period seem now only to have been aggravated

by the enormous population increase. Far from showing the way to a stabilized economy, the United States has provided an unhappy example of commercial exploitation of land and labor by absentee owners. People in the United States need assume no air of superiority when they speak critically of the looting of the resources of a continent by the Spaniards and the Portuguese, or when they observe the "backwardness" of the present Latin-American countries. If the people of the United States wish to know why Latin Americans are not eager to share the material benefits of North American commercial enterprises, they need only examine the plight of Puerto Rico.

THE LAND

Puerto Rico is a little island about 35 miles wide by 105 miles long. It is formed by a tightly folded and faulted arch, the eastern end of the Central American-Antillean system of structures. The Cordillera Central is a continuation of the Cordillera Central of Hispaniola, from which it is separated only by the downfaulted Mona Passage. The highest peak on the backbone of Puerto Rico is just under 4,400 feet in elevation—but just north of Puerto Rico is the deepest place in the Atlantic Ocean, a fault trough which lies 27,972 feet below the surface. Puerto Rico is the much-eroded top of a great mountain system.

Very little of the island is flat, and the flat places which do exist are almost all along the coast (Map 136). On the northern side behind a few discontinuous bits of lowland plain, there is a region of terraces, standing not very much above the sea, but dissected to a rolling, hilly country by the many streams. The mountains begin abruptly south of these terraces, which are especially wide in the western part of the island. The north-facing mountain slopes are deeply dissected by the many streams which have formed narrow valleys and sharp ridges. The main crest of the Cordillera Central, which is also the divide between the streams which flow north and those which flow south, is only ten miles from the southern coast. On the rainy north side the streams are cutting vigorously, but on the drier south side many of the valleys are filled with water only after a shower. Below the rugged belt of foothills, including a series of cuestas of tilted limestone strata, the south coast, like the north coast, is fringed by sea-border plains.

Because of the simple arrangement of these structural features the contrast between rainy northern and eastern slopes and dry southern and western slopes is sharply marked, but the variety of the contrasts is not

so great as that in rugged Hispaniola. On the northeast coast, San Juan, the capital and chief city, receives a rainfall of 60 inches—which in these latitudes may be considered moderate. Ponce, on the southwest coast, receives only about 36 inches—an amount which is quite inadequate to support more than a scanty scrub forest and which does not permit agriculture without irrigation. Ponce has somewhat higher temperatures in summer and about the same temperatures in winter as San Juan, although both enjoy the "temperate" tropical climate characteristic of the trade-wind islands. The rainfalls of the interior of the island on some of the higher slopes of the northern side are well over 100 inches.

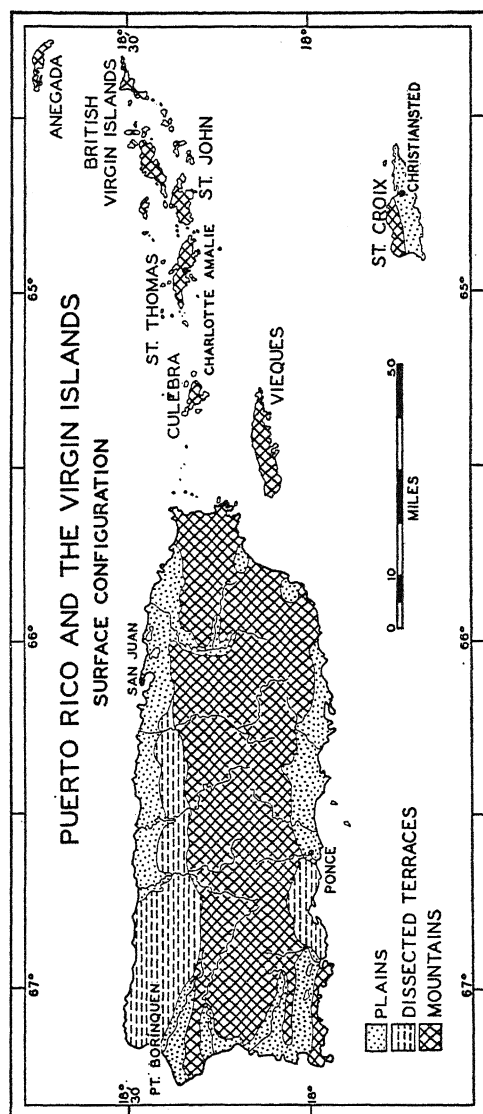
THE COURSE OF SETTLEMENT

Puerto Rico was a paradise for the Indians, who took advantage of its productive lands to reap abundant harvests; and when the Spaniards saw a prosperous and contented Indian population, they thought they too had found a paradise. When the white men first settled on the island in 1508, there were probably between 80,000 and 100,000 native people living on it. But by 1515 the dreadful epidemics of imported diseases had reduced the Indians to not more than 4,000. Since Indians here, as elsewhere, were necessary to the Spaniards, the plantations had to be abandoned and the search for precious metals given up. A few groups of colonists remained in San Juan and Ponce, and most of the interior of the island was used for the grazing of herds of cattle on large estates.

In the eighteenth century, however, Puerto Rico, along with the other Spanish possessions in the West Indies, shared moderately in the sugar prosperity. Into Puerto Rico, as into Cuba and Santo Domingo, there was some importation of Negro slaves, and in certain localities the cultivation of sugar cane was commercially important. About 1790 the Spanish colonies produced roughly 14,000 metric tons of sugar, while the French colonies were producing over 90,000 tons and the English colonies nearly 80,000 tons.

In Puerto Rico the new sugar-cane plantations were mostly located on the lands of low relief near the coast, and in these areas the Negro population soon came to outnumber the whites. The poorer white people were forced out of the sugar districts, for free white workers cannot compete in the same area with black slaves. In the mountainous interior the "poor whites" settled as squatters on the vast, unfenced cattle range of the large landowners, and supported themselves with a shifting cultivation of maize and beans.

Map 136

Between 1800 and 1825 the island colony received a considerable number of white immigrants to balance the increase of Negroes. Some of these came from Spain—from Gallegos, Asturia, and the Balearic Islands; no doubt they selected Puerto Rico because it was one of the few Spanish possessions in the New World in which the spirit of revolt from the mother country had not developed. A number of immigrants to Puerto Rico came from the other Spanish possessions in America from which they had been forced to flee because of their loyalty to the Spanish crown. Consequently, in spite of a continued increase of the Negroes through importation and high birth rate the proportion of the blacks and whites remained approximately the same: in 1802 the Negroes made up 52 per cent of the population; in 1845 they made up 51 per cent. In the latter year Puerto Rico counted 216,183 white people and 227,056 Negroes (205).

During the nineteenth century the colonies left to Spain in the Western Hemisphere suffered from neglect and poverty. The economic collapse resulting from the decline of sugar prosperity was of course greater in those islands where the prosperity had been greater; but places like Puerto Rico also felt the effects. The Spanish government, involved with

difficulties of its own in Europe, could do little to help the remnants of its colonial empire. In the nearly four centuries of Spanish rule in Puerto Rico only 166 miles of road were built, and these mostly in the sugar-cane districts along the coast. The interior was all but inaccessible, and therefore was limited in its possibilities of commercial production to cattle that could be driven out to market over rough trails, or to some high-grade commodity that could command a price high enough to offset the costs of transportation by muleback. The large landowners introduced coffee, and made use of the poor-white settlers of the interior as tenants and share croppers. So fine was the aroma of the Puerto Rican coffee that it commanded a special place on the Spanish market, much as Haitian coffee commanded a special place on the French market. The transportation costs were so high, however, that even with the high prices the Puerto Rican coffee could bring, only a small net profit was left to the landowners, very little of which was passed on to the tenants.

At the end of the nineteenth century Puerto Rico showed all the worst aspects of the Spanish colonial system. There was the usual concentration of land ownership and wealth in the hands of a very small group, who were enabled to maintain positions of prestige and economic security through the exploitation of the much more numerous laboring population. In Puerto Rico these exploited rural workers were not Indians, and only in the sugar plantations along the coast were they Negro; in the interior the tenants were almost pure European. The majority of the people lived in isolation, illiterate and ignorant of the most elementary rules of hygiene, and producing barely enough food to maintain themselves. The political, social, and commercial life was centered in San Juan and involved the participation of only a small fraction of the total population. Such was the condition of Puerto Rico when, largely as a result of forces and events elsewhere, this last remaining Spanish colony became a territory of the United States.

Period of Possession by the United States

To many citizens of the United States the idea that a neglected, poverty-stricken Spanish colony has not been immeasurably benefited by forty years of North American rule may come as a distinct shock. The basic reasons for the relatively successful operation of "free enterprise" in North America and for the failure of this system in many other places are not widely understood. Yet the fact remains that poverty and disease still remain in Puerto Rico as a widespread characteristic, and the exploita-

ion of land and people for quick profit has been continued, but on a scale ncredibly greater than anything the Spaniards were able to reach. The Jnited States is very proud of the material benefits immediately extended to Puerto Rico. By 1919 the mileage of roads over which wheeled vehicles could pass in all weather had been increased from 166 to 739, and as a result, most parts of the island were enabled to bring their products to a market at much lower costs than before, leaving more profit, therefore, to the landowners. Schools were established, and in some of them the newer techniques of agriculture and animal husbandry were taught. Sanitary measures were undertaken at great cost, and certain diseases, such as yellow fever, were virtually stamped out. There can be no doubt of the many benefits Puerto Rico has received as a result of its possession by the United States.

But there is another side of the picture. The increased tempo of economic activity brought about by North American capital investments in new agricultural enterprises together with the better health conditions have resulted in an alarming increase in the rate of population growth. The population of Puerto Rico increased 50 per cent between 1899 and 1930, and in 1940 had reached 1,869,249, giving an average density per square mile over this mountainous island of about 530 people. The increased tempo of the economic life, moreover, has made ever wider the gap between the well-to-do and the poor—and the great majority of the Puerto Ricans are to be classed as poor. Zimmerman writes that "this over-populated island is inhabited by what is probably the largest single group of destitute people under the American flag." [1] In no small part the poverty of the majority of the people is due to the fact that Puerto Rico is included behind the tariff wall of the United States. For while this economic position of Puerto Rico makes possible the profitable production of such commodities as sugar, tobacco, and fruit in competition with places outside of the United States, it also makes it necessary for the Puerto Ricans to purchase whatever they do not produce for themselves in the world's most expensive market. Not only must the Puerto Ricans help to maintain the relatively high standard of living achieved by industrial labor in the United States, but also they must support the higher wage scale of American seamen, since the goods are brought to the island in ships which fly the flag of the United States. The tariff increases the distinction between the prosperity of the producers and the poverty of the rest of the people.

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[1] E. W. Zimmerman, quoted by Rafael Picó, ref. 276, p. 136.

THE PATTERN OF SETTLEMENT

The present distribution of population in Puerto Rico is closely related to the different forms of land use (Maps 137 and 138). Along the coast where sugar-cane plantations are found the densities are very high, perhaps more than a thousand per square mile. High densities are also found where fruit plantations have been established, and in the truck-farming zones around the larger towns. But no part of the island can be described as thinly populated. In the mountainous interior the tobacco and coffee districts have densities probably between 200 and 300 per square mile. Even the areas devoted only to grazing have densities well over 50 per square mile.

Puerto Rico is still predominantly a land of large private properties. According to the census of 1935 there were in that year 52,790 farm properties on the island. More than 34 per cent of the total area in farms, however, was included in only 335 of the properties—in less than 1 per cent of the total number of farms. These large properties included more than 46 per cent of the total value of farm lands and buildings. On the other hand, half of all the farm properties are less than ten acres each; in this group was included only 7 per cent of the total farm acreage, and only 6 per cent of the total value of farm lands and buildings.

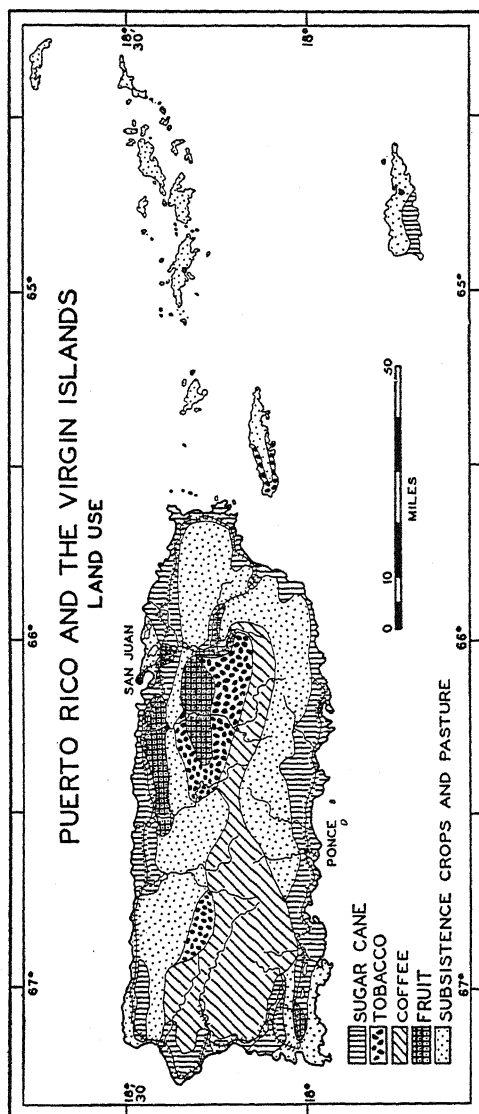
The Sugar Plantations

The problem of population and land in Puerto Rico is greatly aggravated in the densely inhabited sugar districts by the fact that a very large part of the sugar business is carried on by a few absentee owners. Nearly half of all the sugar produced in Puerto Rico in 1935 came from the plantations of four large companies. In addition to these four corporate holdings in 1935 there were twenty-six other properties belonging to companies outside of Puerto Rico, there were forty-one sugar mills which owned the lands in their vicinity, and there were one hundred landlords who did not own mills. The average size of all these properties was 40,000 acres. Compared with all agricultural enterprises in Puerto Rico, these sugar plantations comprised about 40 per cent of the farm acreage, about 56 per cent of the value of all farm lands and buildings, employed about 50 per cent of all the agricultural workers, and produced about 60 per cent of the value of all Puerto Rico's exports. The importance of sugar in the economic life of the island is obvious (276).

The population problem created by this concentration of economic power is similar to that which appears in most districts devoted exclu-

sively to the production of sugar. There is a very great need for farm laborers at the harvest season, for reasons already outlined in the discussion of Cuba. But for the rest of the year only a small fraction of the labor needs of the harvest season are required. There is always a certain amount of work around the estates: clearing new land, plowing, planting new cane, or weeding the young growth of cane. But no steady employment for the great majority of the inhabitants of the sugar districts can be offered by the planters. Seasonal unemployment is increased by the use of machinery; yet machinery, which brings low costs of production per unit, gives greater profit to the absentee stockholders.

Map 137

Most of the sugar plantations are located along the coastal lowlands and terraces of Puerto Rico. Unfortunately, in the effort to increase the acreage of this very profitable crop the area devoted to cane has been expanded beyond the few level sea-border plains which are well suited to cane cultivation. Where the cane fields have been extended onto the hilly terrace land, inland from the northern coast (Map 136), soil erosion has been very great. Vast acreages of good farm land have been so completely destroyed by gullies that today they are not even available for

the grazing of cattle. Too late to save much of this terrace land are the efforts of the Soil Conservation Service during the past decade.

The cane plantations on the northern coast of Puerto Rico depend on natural rainfall; but along the southern coast, where the climate is much drier, the cane fields must be irrigated. The increased cost of irrigated agriculture is compensated by the higher yields of sugar from cane grown where there are more hours of sunshine.

The break-up of the large properties is one of the most important aspects of the present attempts to solve the population problem of Puerto Rico. As a matter of fact these large holdings are not legal. When Puerto Rico was set up as a territory, a law was adopted which definitely limited the size of agricultural properties to a maximum of 500 acres. The law simply has not been enforced. Not until 1938 was the first attempt made to force the sugar producers to limit their plantations to 500 acres, and this attempt was upheld in the courts. As an experiment in the redistribution of land, the Puerto Rico Reconstruction Administration, an agency of the federal government, purchased, in 1935, a large estate of about 10,000 acres on the southern side of the island and another 8,000 acres of leased land, which together gave support to about 4,400 people. This land is now divided into 500-acre farms; the farmers have united in several co-operatives for the more efficient operation of their plantations, and the sugar mill is co-operatively owned and run. The results of this important experiment will guide the government agencies which must undertake the work of land redistribution elsewhere on the island. Together with the Mexican experiments in land tenure, this constitutes one of the most significant efforts to face a serious social problem now going forward in Latin America.

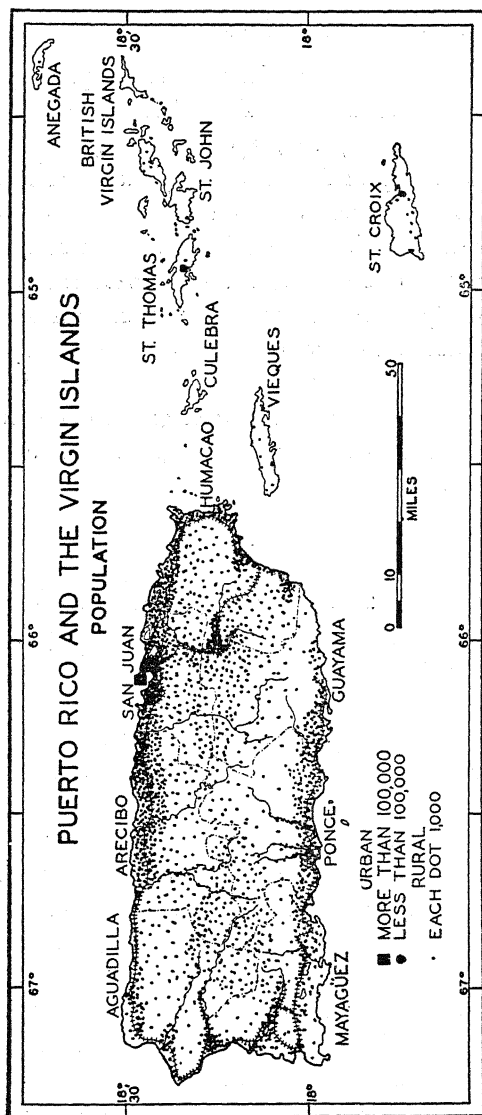
The Tobacco Farms

Another crop which has been greatly stimulated by access to the North American market is tobacco. In 1934, Puerto Rico supplied the United States with 40 per cent of the tobacco used as cigar filler. Unlike the system of tenure prevailing in the sugar districts, here, in the tobacco district, 47 per cent of the farms are operated by their owners, and 31 per cent by tenants or share croppers. The average size of farms is small: the few large plantations, operated in part by wageworkers, average a little over 60 acres in size; the smaller owner- or tenant-operated farms average only 14 acres. Of all the farm properties in Puerto Rico, those on which tobacco is the leading crop make up about 25 per cent; and

the tobacco farms include about 13 per cent of the total farm area, about 8 per cent of the total value of land and buildings, and give employment to about 15 per cent of the agricultural workers.

The tobacco farms are not utilized exclusively for tobacco. The tobacco plants are set out commonly in November and the harvest takes place in February and March. After tobacco is cleared away, the same fields are utilized for maize, beans, rice, yams, and other food crops, which are harvested in May or June. Furthermore, only about a quarter of the area of the average farm is used for tobacco—the remainder being devoted to additional food crops and to the grazing of animals.

Map 138

The tobacco district is located in the mountain valleys of the wetter northern slopes of Puerto Rico. The proportion of level land or land of gentle slope is small, and what land of this sort is to be found is in scattered and isolated patches in valley bottoms or on the interfluves. Most of the tobacco farms include a large proportion of steep lands, where measures to protect the surface from erosion are very important. Modern scientific farming is of vital importance in the conservation of the agricultural lands of the mountainous interior.

The Fruit Plantations

In recent years the commercial production of tropical fruits has outranked tobacco in value. The more important of the crops included in this category are grapefruit, oranges, and pineapples. Fruit production is largely in the hands of planters who came to Puerto Rico from the United States, who operate their own farms, and who reside on them permanently. The chief area of citrus fruit production is located along the northern coast, just to the west of San Juan, where the plantations are easily accessible to the port and where the transportation problem is reduced to a minimum (Map 137). By 1908 the export of fruit had already passed a million dollars a year, and by 1928 it had passed seven million dollars. The fruit-growing area in the mountains south of San Juan is of more recent origin, and is devoted more especially to pineapples.

The Coffee Plantations

In contrast to the properties used for the production of sugar cane, tobacco, and fruit, which have mostly been developed by capital from the United States and which are profitable largely because of the fact that Puerto Rico has direct access to the market in the United States, the coffee plantations are for the most part owned by Puerto Ricans, and the coffee business is less profitable than it was formerly precisely because of the fact that the product must be sold in the United States. When Puerto Rico ceased to be a colony of Spain, the Spanish government promptly placed a tariff against imports of coffee from this island, and as a result the Puerto Rican coffee planters lost their traditional market. But the people of the United States, long accustomed to the flavor of Brazilian coffee, roasted in the North American manner, did not develop an appreciation for the fine aroma of the West Indian product. Coffee planting in Puerto Rico has been declining since the beginning of the period of possession by the United States.

The coffee plantations, however, are still of importance in the agricultural picture of Puerto Rico. About 20 per cent of the farms of the island report coffee as the chief commercial crop. These farms make up about 25 per cent of the total area in farms, and about 16 per cent of the value of agricultural land and buildings. About 18 per cent of the planters of Puerto Rico raise coffee. The average size of the plantations in this group is between 150 and 175 acres, and 70 per cent of the properties are cultivated by their owners.

The coffee plantations are located for the most part in the mountains, and, like the tobacco farms, are chiefly on the rainy northern slopes. Coffee is a crop, as we have already seen, which can be raised satisfactorily on steep slopes, and the use of land of this sort for coffee does not result in serious problems of soil erosion. The higher and steeper parts of Puerto Rico are ideally suited for coffee, and in these areas there are few other uses which can compete effectively with coffee. As in many parts of Latin America, coffee is the crop which first made these rugged surfaces productive. The decline of coffee planting in the present century is chiefly the result of the necessity of selling in a market where the Puerto Rican product finds little favor.

IS PUERTO RICO OVER-POPULATED?

The enormous increase in the rate of population growth was one of the unexpected results of the transfer of Puerto Rico to the United States. This increase has not been the result of immigration, for there has been very little movement from the mainland of the United States to this island territory—in fact there has been a small but steady emigration of Puerto Ricans to the mainland. Population increase results from excess of births over deaths; partly due to a rise of the birth rate, but chiefly to the decrease of the death rate.

The health problem in Puerto Rico is, however, by no means solved. The average inhabitant of the rural districts is still improperly nourished; for the quickened economic activity of the island has been directed to the production of commercial crops, not crops for local subsistence. The Puerto Rican worker still supports himself on a diet of maize, beans, rice, dried meat, and salt fish. This diet is much less satisfactory for the maintenance of health and energy than that of the Haitian peasant with his varied list of vegetable crops. Because of widespread malnutrition, there is little resistance to such diseases as hookworm, tuberculosis, and malaria.

The local manufacture of low-priced goods for sale in Puerto Rico has yet to develop. Since so large a part of the profits of commercial agriculture go to the owners of capital in the United States, there is little wealth accumulated on the island to support the establishment of new industries; and the few wealthy Puerto Ricans who might wish to invest in such domestic manufacturing plants fear that products from the United States would be "dumped" on them at ruinous prices.

So it is that the system of North American business enterprise, applied

to a territory whose population for one reason or another is unable to gain any important share of the profits, has led to the exploitation of land and labor on a scale vastly greater than the former owners of Puerto Rico were able to reach. Sugar cane production, for which the country as a whole is not so well suited as is Cuba because of the large proportion of mountainous surface, has been greatly increased, while coffee production, for which Puerto Rico is well suited, has suffered a collapse. The increased cost of living and the increased numbers of people more than make up for any expansion of economic opportunity offered by the investment in Puerto Rico of North American capital. But Puerto Rico is not necessarily over-populated. We have already discussed many different cases of maladjustment between population and the productivity of the land, and in each case we have found that not the land itself is the cause of this maladjustment, but rather the system of using the land and the system of land tenure. But to change the system is not at all easy. This is the plight of Puerto Rico.

THE VIRGIN ISLANDS

The possessions of the United States in the West Indies include in addition to Puerto Rico (and its dependency, Vieques), the three American Virgin Islands, St. John, St. Croix, and St. Thomas. These islands, which were ruled in turn by the British and the Danes, were purchased from Denmark in 1917. Some 90 per cent of the inhabitants are Negro, and a great variety of nationalities are represented in the white 10 per cent. Each of the islands differs from the others in its density of population and the nature of its economy (283, 284, and 285).

St. John

The island of St. John has the lowest density of population of the three American Virgin islands—only about 38 people per square mile. The surface of St. John is very rugged, with few patches of flat or even gently sloping land. Furthermore, of the three, it is the most remote from the usual routes of travel. The scanty population, which totaled 722 in 1940, is grouped in villages along the coast. Much of the interior is used only for the grazing of cattle. The island has one important commercial product, however: bay leaves are collected from the trees of the scrub forest and exported to St. Thomas.

St. Croix

St. Croix has a much larger population than St. John. Most of it is rural. There are 135 people per square mile on this island, concentrated in an area of lowland which has long been utilized for the production of sugar cane. Even with the aid of tariff protection, the St. Croix plantations are marginal producers of sugar, scarcely able to survive in times of low prices. In 1835 there were more than 18,000 people on St. Croix; but by 1940 there were only 12,902. The sugar produced on St. Croix at the present time is converted into alcohol; and the alcohol, like the bay leaves of St. John, is shipped in small boats to St. Thomas.

St. Thomas

The island of St. Thomas had a population in 1940 of 11,265, with a density of 348 people per square mile. Unlike St. Croix, however, very little of this population is rural. Three quarters of the people live in the chief port, Charlotte Amalie, which is located on a fine, protected harbor on the southern side of the island. For a long time this was an important coaling station, and a port of call for many ships. The products of the other American Virgin Islands, bay leaves and alcohol, are brought together on St. Thomas where they are manufactured into bay rum, the chief export product of the whole group.

The population of all three islands is declining, and the relative proportion of Negroes is increasing. Since 1917 there has been a steady emigration to the United States. The chief importance of the islands to the North Americans lies in their strategic value.

31

EUROPEAN POSSESSIONS IN THE WEST INDIES

THE BRITISH WEST INDIES

AMONG THE EUROPEAN POSSESSIONS in the West Indies three islands, all belonging to Great Britain, are of outstanding importance in terms of population and economic condition (278). These are Jamaica, Trinidad, and Barbados. These three islands shared the experience of sugar prosperity in the eighteenth and early nineteenth centuries, and of declining prosperity after the first third of the nineteenth century; but in the twentieth century each of them has arrived at a somewhat different solution leading to the re-establishment of a measure of economic stability. All could still produce sugar to advantage were it not for the tariffs and subsidies in the consuming countries which weigh heavily against the tropical colonies. In all three sugar cane planting was carried on by Negro slaves, and today the proportion of black people in the total population is large. In Jamaica and Barbados the blacks are increasing at the expense of the whites.

JAMAICA

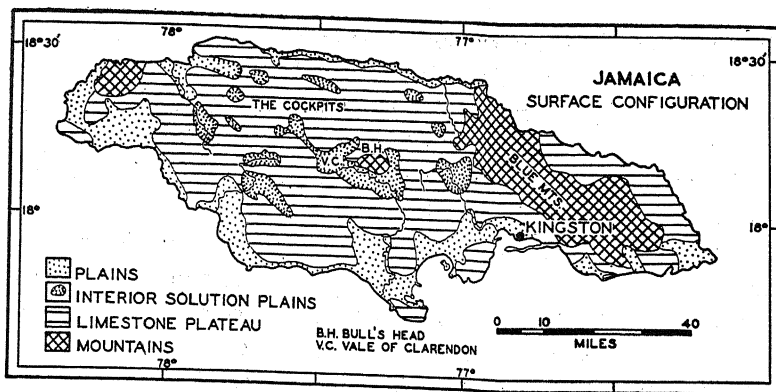
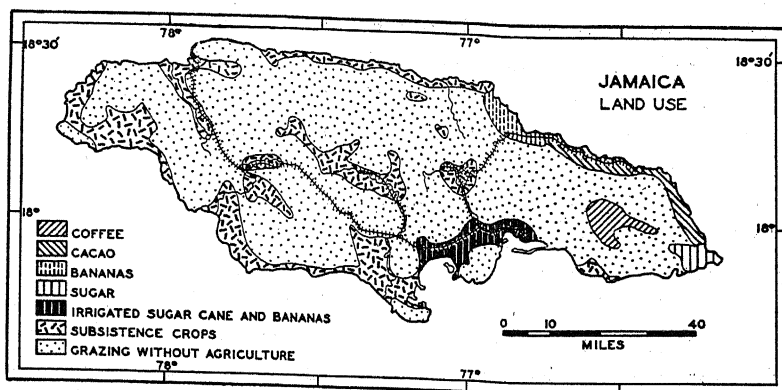
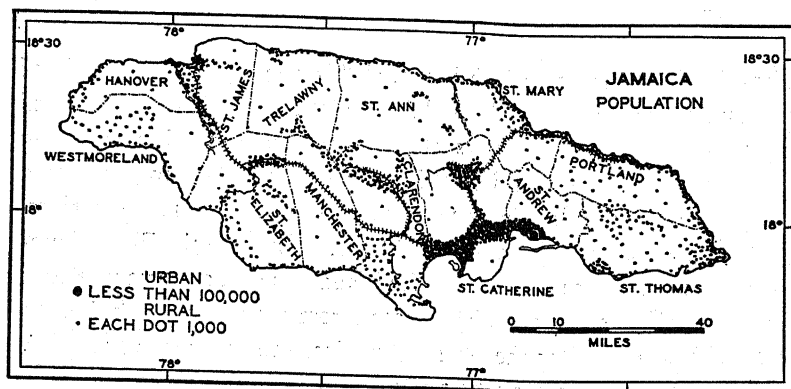
The density of population in Jamaica is high. According to estimates in 1938, this island, with an area of 4,450 square miles, had a population of 1,173,645, an average density of about 267 people per square mile.

The Jamaicans, however, are much more irregularly distributed than are the Haitians or even the Puerto Ricans: much of the island has a relatively thin population, whereas the densities in the areas of concentrated settlement are probably well over 1,000 per square mile (Map 141). Yet Jamaica cannot be said to have any serious problem of maladjustment between people and land, as we shall see.

The population of Jamaica is predominantly black. The Negro-white ratio is sixty to one, and the Negroes are increasing more rapidly than the whites. In 1820 the ratio was much less extreme, for in that year there were 35,000 white people and 350,000 Negroes. In 1932, however, there were only 15,000 whites, while the Negroes had increased to 900,000.

The rate of population increase remains high in spite of the fact that Jamaica for many years has had a steady current of emigration. Jamaica Negroes are known all around the Caribbean for being dependable, hard-working laborers. They provide an important source of supplementary workers in the sugar-harvest season in Cuba. They provided the man power which actually produced and maintained the banana plantations of the Caribbean Lowlands in Colombia, Costa Rica, Nicaragua, Honduras, and Guatemala. They furnished the chief source of laborers for the construction of the Panama Canal, and the Canal Zone still has a large proportion of them in its population. This emigration accounts in part for the continued prosperity of Jamaica in the modern period because of the money sent back by the emigrants to help in the support of relatives who remained behind.

The Land

The island of Jamaica, which is exceeded in size among the islands of the West Indies only by Cuba and Hispaniola, is a part of the Central American-Antillean mountain system. Its mountains, however, are deeply covered with upraised coral limestone (Map 139), and in only a few places do the underlying geologic structures appear at the surface. The highest elevation, a little over 7,000 feet, is found in the Blue Mountains, situated in the eastern part of the island—an area of narrow ravines and sharp, knifelike ridges which descend from the central peak like the spokes of a wheel. But the Blue Mountains, and the two other much smaller mountainous areas where the underlying formations appear at the surface, are almost completely surrounded by the limestone formations which have accumulated to depths of many thousands of feet.

Map 139

Map 140

Map 141

The limestone plateau, which at its highest point is about 3,000 feet above sea level, extends from the easternmost point to the westernmost point, a distance of 144 miles, and from the northern side of the island to the southern side, a distance of 49 miles. At many places it borders the sea with cliffs a thousand feet high, but at other places the ascent onto the plateau begins behind a narrow fringe of sea-border plain, varying in width up to five miles.

The surface of the limestone plateau is by no means flat. Not more than 14 per cent of Jamaica can be classed as flat. Streams have cut deep valleys back from the coast, and the limestone itself is honeycombed with caverns and pitted with sinks. In the section known as the "cockpits," in northwestern Jamaica, some of the many sinks are as much as five hundred feet deep. In the midst of the plateau there are several large solution basins, their bottoms deeply filled with a residual red soil which is as highly productive as the similar red soils of Cuba. The largest of these solution basins is the Vale of Clarendon, fifty miles long by twenty miles wide, which has been opened up on one side of the volcanic ridge known as the Bull's Head. These solution basins contain some of Jamaica's most productive agricultural land, and are densely populated. Similarly the coastal lowlands are generally areas of concentrated settlement, especially the large lowland which lies north and west of Kingston, chief city and capital of the colony (Map 141).

The rainfall is heaviest on the northeast side, particularly in the Blue Mountains; and it is lightest on the southern and western sides. The sea-border plains of southern Jamaica, including the one near the capital, are too dry to support agriculture without irrigation. Kingston, for example, receives an average of only about 29 inches. Over 100 inches a year is received in the plains on the northeast side. The top of the Blue Mountains, almost always deeply buried in great, billowing cumulus clouds, receives between 150 and 200 inches a year.

Disasters come every now and then to Jamaica. In 1915, 1916, and 1917 destructive hurricanes visited the island, but since 1917 only two of these storms, in 1932 and in 1939, passed close enough to do damage. Kingston was destroyed by an earthquake in 1907.

Sugar Cane Plantations

Jamaica was at one time one of the richest colonial possessions of Great Britain. In 1780 Jamaica was much more important to Britain as a source of revenue than the struggling colonies of eastern North

America. Sugar exports were mounting year by year as more slaves were brought in from Africa and new sections of the sea-border plains were brought under the plow. The most productive lands were to be found on the largest of the coastal lowlands in the southeast, especially around Kingston—a district in which the costs of production were increased by the necessity of irrigation, but in which the high yields per acre of sugar more than compensated for the necessary capital investment. In 1805 the largest sugar export was reached; thereafter, for the various reasons already outlined, sugar production fell off; the emancipation of the slaves in 1836 marked the end of the era.

Sugar cane is still important in the modern period, but it is no longer the one product, not even the leading product. Certain of the concentrations of people, however, are related to the areas of cane planting (compare Maps 140 and 141). In 1930, some 44,000 acres, out of a total cultivated area of 278,000 acres, were devoted to sugar cane. The densely populated coastal lowlands west of Kingston are still the chief area of sugar production, although no longer used exclusively for this crop. Near the eastern extremity of the island there is a small area of concentrated sugar-cane planting, and there are patches of sugar cane mixed with other crops on all the sea-border plains of the northern and southwestern sides. Almost all the sugar is produced by eight large plantations, and the small independent farmers have turned to other kinds of production.

Bananas

The crop which rescued Jamaica from the depression following the decline of the old sugar prosperity is the banana. In the modern period bananas occupy more than twice the acreage of sugar cane, and bananas make up from 50 to 60 per cent of the exports. In 1930, the agricultural census indicated that approximately 90,000 acres were planted to this crop. The important point concerning banana cultivation in Jamaica is that the greater part of this acreage is on small farms owned by independent growers. The United Fruit Company, in 1939, had only 4,277 acres in Jamaica, and another North American fruit company had smaller areas under cultivation; but the remainder of the banana crop is grown by some 11,000 independent planters, who have formed a co-operative to protect themselves from the large companies to which they sell their product. Of the 11,000 growers, only 30 had plantations larger than 300 acres.

The banana lends itself far better than sugar cane to small-farm produc-

tion. To be sure, the banana grower is no better able to reach the market independently than is the small sugar-cane producer. The disadvantage the latter is under in that he must sell his cane to the near-by sugar mill (and unless the planters own the mill on a co-operative basis, the mill is usually run by an absentee corporation) is balanced by the fact that the banana grower cannot ship his bananas to the market without the expensive and highly specialized docks and ships owned and operated by the large fruit companies. The chief advantage to the small banana planter is that his crop can be harvested throughout the year; labor demands and cash income, therefore, are more nearly stabilized than in the highly seasonal sugar-cane business.

The banana cultivators of Jamaica are scattered widely over the island, but with certain areas of marked concentration along the coast. The chief area of banana planting is on the lower northern slopes of the Blue Mountains where these slopes actually touch the northeastern coast. The coastal lowland west of Kingston, long the chief area of sugar-cane planting, is now one of the chief areas of banana cultivation; and the bananas grown under irrigation in this district are said to be the best that Jamaica produces. Bananas, like sugar cane, are of less importance in the interior than on the coastal lowlands.

Settlement of the Interior

In the interior of Jamaica there are spots of dense population located in the solution basins of the limestone plateau, and large areas over which the people are more thinly scattered. Only 10 per cent of the total area of the island is under cultivation. The cultivated areas in the solution basins are utilized for a variety of subsistence food crops grown on small farms. In 1930, food crops were second only to bananas in total acreage, occupying approximately 54,000 acres—a very important fact contributing to the economic stability of the colony. In various parts of the island, however, the food crops were grown along with a variety of commercial crops. All over Jamaica there are coconut palms; coconuts in 1930 occupied as much as 40,000 acres, but in scattered small units with no important areas of concentration. High-grade coffee is produced on the slopes of the Blue Mountains up to about 4,500 feet above sea level. Coffee, in fact, was for a time the leading product of Jamaica, gaining its favored market in Great Britain. The area devoted to coffee in 1930 was 18,400 acres, but in 1939 it was only a little over 6,000 acres. In some of the wetter northeastern parts of the island cacao plantations are of importance, occupying 4,600 acres in 1930. There are, in addition,

smaller acreages of tobacco, cotton, and a variety of fruit trees such as pimento, orange, grapefruit, breadfruit, and mango.

The greater part of the island, however, is used for the grazing of cattle. There are large areas of the limestone plateau which are too dry, or too rough for agricultural use in competition with the very productive basins and valleys. The cockpit region of the northwest, for instance, is mostly utilized for cattle, grazing on natural savanna grasses. Large cattle pens —as the Jamaican ranches are called—are found throughout the island.

The population of the interior, unlike that of interior Puerto Rico in the Spanish period, is not isolated. Good roads passable throughout the year by motor trucks give easy access to all parts of Jamaica, and over these roads most of the products of the interior are carried. The large fruit companies, for instance, send motor trucks to the most remote banana plantations, picking up a few bunches here and a few there. The degree of ease of circulation is an element of major importance in interpreting the economic contrasts between islands in the West Indies which seem so nearly equal in natural endowment, but which have experienced such very different courses of settlement.

TRINIDAD

The second of the more important British possessions in the West Indies is the island of Trinidad (Map 142). This island, with an area of nearly 2,000 square miles, is occupied by approximately 456,000 people with an average density of 245 per square mile. Perhaps 60 per cent of the population is Negro, and 7 per cent is white or nearly white—a classification which is difficult to make with certainty since there is no color line on the island, and almost all the native born white people have some Negro ancestry. A third of the population is made up of East Indians, introduced as indentured laborers between 1845 and 1917. Sugar cane was formerly of much greater importance than it is at present, although Trinidad has continued to devote a part of its area exclusively to cane production. Cacao is now the leading crop; and the exports of the island include also coconuts, limes, grapefruit, and asphalt from the famous Pitch Lake.

The Land

Trinidad does not belong geologically to the West Indies, but rather to the continent of South America. Its separation from the easternmost point of northern Venezuela is due to a fault depression in the Caribbean

The photograph above was taken in British Guiana. In the lagoons behind the coastal sand bar, on which most of the population is clustered, land excellently suited to the production of rice can be found. In this picture a group of workers are setting out young rice plants. The chief market for rice is among the many East Indians who came to British Guiana originally as contract laborers, and elected to remain when their terms of service were completed. Below is the main business section of Georgetown, capital of the colony. (Both photos, courtesy of the British Guiana Information Bureau.)

Coastal Range. Beyond the narrow passage which separates the island from the mainland the same mountain structures which form the coastal range of Venezuela continue across the whole northern side of Trinidad, reaching a maximum elevation of about 3,000 feet. The southern part of the island is made up of two ranges of low hills, not more than 1,000 feet in elevation, crossing diagonally from northeast to southwest, and two lowland areas, now slightly uplifted and dissected by streams. Mangrove-filled swamps, separated from the sea by wide sandy bars, characterize a part of the west coast and a part of the east coast.

Trinidad lies in the path of the trade winds. At the eastern end of the northern range the rainfall is as much as 150 inches, and a belt of more than 100 inches extends southward about five miles inland from the east coast. Over this belt large cumulus clouds begin to form early every day, even during the drier part of the year, and these clouds drift westward across the island bringing brief but heavy downpours of rain. The rainfall decreases toward the west, dropping to between 50 and 60 inches along the west coast, and to less than 50 inches on the westernmost end of the northern range. The rainy season is between June and December, in which season, on an average, two days out of three on the western side of the island are rainy (that is, they receive at least one shower). During the season of less rain an average of one day out of three has at least one shower. On the eastern side of the island during all months of the year there are very few days which do not have frequent showers interspersed with periods of brilliant sunshine. In the pocket-like valleys of the Northern Range there are small areas, protected from the winds, which have typical hothouse climates, especially suitable for cacao.

The temperatures on Trinidad, which lies only about 10° north of the equator, are even more "temperate" than those experienced on the northern islands of the West Indies. The range between the average of the warmest and the coldest months at Port-of-Spain, on the western side of the island, is only about 3°, and the average for the year is about 77°. Cold air masses from North America do not reach Trinidad, nor do the hurricanes ever touch this fortunate island, for they reach the West Indies on their way across the ocean from western Africa at least two degrees of latitude farther to the north.

Trinidad was originally covered almost completely by a heavy tropical rain forest. Only the dry westernmost end of the northern range had a scanty vegetation of xerophytic character. The highest peak of the northern range, only 3,000 feet in elevation, is clothed to its summit with forest.

Settlement of Trinidad

Trinidad was for a long time a possession of Spain. Because it contained none of the resources either of land or of people which were attractive to the Spaniards it was never effectively settled by them. Port-of-Spain was established on the western side of the island at the southern base of the northern range, where protection from the easterly winds together with a deep anchorage and a firm landing place offered ideal conditions for a port. The island was still scantily occupied when, in 1783, the French began to appreciate its possibilities for the growth of sugar cane. Although it remained a Spanish possession, many Frenchmen came to Trinidad at that time, introducing Negro slaves in considerable numbers. In 1797, however, Trinidad was occupied by the British and became a colony of that country in 1802. Its white population to this day reflects this background of settlement, for there are many families of French and Spanish descent as well as those which came later from England.

The early nineteenth century witnessed the rapid spread of sugar cane over most parts of the island. Trinidad began to produce late in the sugar period, and its first development was carried on all the more rapidly because of the anticipation of quick profits. The forests were cleared and plantations laid out in all but the wettest and steepest areas. The blow to West Indian sugar planters which resulted from Napoleon's embargo on cane-sugar imports to continental Europe came upon Trinidad when it was in the full swing of its pioneer development. For a time the planters continued optimistically to clear new land, but the abolition of slavery in 1836 put an end to this first period of sugar-cane planting. The plantations in many parts of the island were abandoned, and the forest once more began to creep back over the fields cleared for the growth of cane.

Cacao had been introduced into Trinidad during the Spanish period, and in some of the pouch-shaped valleys of the northern range where the humidity is very high and there is complete protection from the winds, cacao yielded remarkably well. With the decline of sugar cane, many of the planters turned to the production of cacao—a crop which is grown almost literally in the forest, for the low cacao trees must be shaded by larger trees which form an almost complete canopy of foliage overhead.

Sugar-Cane District. At the present time the agricultural divisions of Trinidad are sharply marked. The localization of sugar-cane planting in

the relatively dry zone on the western side took place in the modern period of large-scale mills. The best yields per acre of sugar are found where the sunshine is least interrupted by clouds, for although the growth of cane per acre is greater in the wetter parts of the island, the sugar content is much lower than in the zone where the rainfall is less than 75 inches. Here several large sugar *centrals* have been built. The largest one, which turns out about a third of Trinidad's sugar, is located near the town of San Fernando. On the 24,500 acres owned by this company, sugar cane is produced by wage workers on 11,500 acres, and by tenants on 6,000; the remaining 7,000 acres are left in pasture or forest. A part of the cane for the mill, however, is purchased from small independent cane growers who are located around the company lands (287).

Because of the large labor requirements of sugar production the sugar district is densely populated. The majority of the wage workers and also of the independent planters are Negroes and East Indians. The latter were introduced after 1845 under contract to work for the sugar companies for a period of years. After the period of their contract had expired many returned to India; but some remained in Trinidad as independent planters. This emigration was stopped by the Indian government in 1917, but not before a very considerable permanent addition to the population of the British West Indies, and especially Trinidad, had been made. A reservoir of additional labor for the sugar-cane plantations is in the belt of very dense settlement which follows the base of the northern range eastward from Port-of-Spain. Here Negroes and Asiatics occupy small properties devoted mainly to the production of food crops.

The production of sugar in a region possessing such ideal natural conditions of soil and climate as Trinidad could be greatly increased were it not for the subsidies and tariffs used, even within the British Empire, to support the sugar-beet industry. Sugar planting for a long time has been a highly nationalistic enterprise; each nation attempts to satisfy its own requirements from sources of production either within its immediate boundaries, or from its own tropical possessions, and that free exchange of goods which would permit a localization of the industry in those places where the costs are lowest does not exist. Trinidad is thus entirely shut out from the markets of the United States and of continental Europe, and must compete with subsidized beet sugar within the British Empire. Trinidad's cost of production is about 55 cents per ton, as compared with 50 cents per ton in Cuba, 49 cents in Java, 68 cents in Hawaii, and $1.21 in Queensland, Australia.

LESSER ANTILLES
SURFACE CONFIGURATION
LOWLANDS
HILLS
MOUNTAINS
CHIEF VOLCANIC PEAKS
0 50 100
MILES
62°
60°
18°
16°
14°
12°
ANGUILLA
ST. MARTIN
ST. BARTHÉLEMY
SABA
ST. EUSTATIUS
ST. KITTS
NEVIS
REDONDA
BARBUDA
ST. JOHN'S
ANTIGUA
MONTSERRAT
GRANDE-TERRE
DÉSIRADE
GUADELOUPE
POINTE-À-PITRE
MT. SOUFRIÈRE
BASSE-TERRE
MARIE GALANTE
ILES DES SAINTES
DOMINICA
CARIBBEAN
SEA
MT. PELÉE
MARTINIQUE
FORT-DE-FRANCE
ST. LUCIA
ST. VINCENT
BRIDGETOWN
BARBADOS
THE GRENADINES
GRENADA
ST. GEORGE'S
TOBAGO
VENEZUELA
PORT-OF-SPAIN
TRINIDAD
SAN FERNANDO

Map 142

LESSER ANTILLES
POPULATION
URBAN
LESS THAN 100,000
RURAL
EACH DOT 1,000
0
50
100
62°
60°
18°
16°
14°
12°
ANGUILLA
ST. MARTIN
ST. BARTHÉLEMY
SABA
BARBUDA
ST. EUSTATIUS
ST. KITTS
NEVIS
ANTIGUA
REDONDA
MONTSERRAT
GRANDE-TERRE
DÉSIRADE
GUADELOUPE
BASSE-TERRE
MARIE GALANTE
ILES DES SAINTES
DOMINICA
CARIBBEAN
SEA
MARTINIQUE
ST. LUCIA
ST. VINCENT
BARBADOS
THE GRENADINES
GRENADA
TOBAGO
VENEZUELA
TRINIDAD

MAP 143

The Cacao District. The part of Trinidad which is used for the production of cacao is sharply set off from the sugar-cane district. The landscape of the latter district is one of open fields of cane, dotted with little villages of workers' homes, or with sugar mills and estate headquarters. The landscape of the cacao district is one of dense forest, with only here and there a few scattered clearings where the headquarters of the cacao estates have been established. The sugar-cane district is densely populated, but the cacao district has only a thin population. The cacao plantations are found throughout the eastern part of Trinidad.

Cacao does best in places protected from the wind, where the temperature and humidity are like those of a hothouse. In such places one finds that unpleasant kind of tropical climate the effects of which are so frequently pictured in the movies. In Trinidad conditions of this sort are found in the dense forests back from the immediate east coast, and especially in the protected valleys of the northern range and the two hilly belts farther south.

Although the population of the cacao districts is much less than that of the sugar district, the economic life of Trinidad, especially of the people who live in Port-of-Spain, is intimately tied up with the annual cacao harvest and with the state of the world market. Trinidad cacao commands a good place on the world market because of its superior quality as compared with that grown on the African Gold Coast or in Brazil. But severe competition with these other areas where production costs are very low has tended in recent years somewhat to reduce the acreage of cacao in Trinidad.

The Coconut District. Another commercial product of Trinidad which supports only a very few people but which contributes a relatively steady income is the coconut. From the coconut palm several products can be derived: the whole nuts can be sold as fruit; the meat can be sold as copra, the source of coconut oil (of great value in soap manufacture); and the coconut shells produce a quality of charcoal which is extremely absorptive of gas (of great importance for the manufacture of gas masks). Three chief areas are devoted to coconuts in Trinidad: the northern coast, the western tip of the southwestern peninsula, and the sand bars of the eastern coast.

The Asphalt and Oil District. Trinidad also has its mineral resources—asphalt and oil. The well-known Pitch Lake, visited each year by thousands of tourists, is located on the northern side of the southwestern peninsula. This is a natural deposit of asphalt, derived from oil seepages,

and occupying a depression with an area of some 212 acres. Although asphalt now comes largely from oil refineries, some natural asphalt is still taken from this very rare deposit. In the vicinity of the Pitch Lake there is a small oil field.

Port-of-Spain

The focus of all these varied activities is in Port-of-Spain, now a city of nearly 78,000 population. This is the seat of the colonial government, the place where the business interests of the island are centered, the place where the products of the island, except the oil and asphalt, are brought to be loaded on ocean ships. Near Port-of-Spain is the Imperial College of Tropical Agriculture, a place to which young men from all over the British Empire come to study tropical farm practices and administration. Port-of-Spain is also an important stopping place on the airlines between the United States and the east coast of South America. In the present period it possesses much strategic importance as a naval base.

BARBADOS

Barbados is another island which belongs geologically to South America, since it stands on a portion of the continental shelf. It is composed of coral limestone, now lifted above the sea to form a series of level terraces, the highest of which is 1,100 feet. The general flatness of the surface is unbroken by mountain peaks, or by deeply cut valleys, and for this reason the moist trade winds are not forced to rise as much as they are on any of the islands previously described. The average annual rainfall is between 50 and 70 inches. Since there are no surface streams, the water which follows underground caverns in the limestone has to be brought to the surface by windmills.

The significance of Barbados to the student does not lie in its size, which is only 166 square miles; or in its total population, which is only about 193,000; but rather in its extraordinary density of population, which is now about 1,163 per square mile—the greatest rural density in Middle and South America. Barbados was one of the earliest of the West Indian islands to be occupied by a European nation other than Spain. A British colony was established on it in 1625. By 1640 its population consisted of 37,000 white people and 6,000 Negro slaves. Between 1667 and 1678 its population was reported as consisting of 20,000 whites and 40,000 blacks. By 1786 the white population was only 16,000 and the Negroes were more than 62,000. The steady increase of

the Negroes after the beginning of the nineteenth century brought their number to 180,000 in 1921–22, while the white population remained more or less static, about 15,000. At present only about 7 per cent of the population is white.

Barbados is sometimes offered as an example of the inability of white people to settle permanently in a wet tropical land. Many writers, especially among the British, have insisted that in such climates the white man cannot engage in hard labor, and that the birth rate gradually decreases through an increase of sterility among the women. The popular impression of a tropical climate as one of intense heat, in which white people cannot live normal lives, is perpetuated in the stories and movies of the present day, and, in fact, in many geographical writings. The weight of evidence seems, however, to be opposed to this interpretation (205). The prevailing popular dislike of hot weather among Occidental people is perhaps a culture trait inherited from a long-standing tradition of diet and clothing adapted to cool or cold climates. For example, no one can face hot weather with any pleasure who must always appear in public with collar and necktie. With more comfortable clothing and with a diet regulated for the needs of the body where the production of heat is not necessary, perhaps in the course of time people would overcome the very prevalent fear of high temperatures.

There are many parts of the wet tropics in which successful white colonies have been established. We have already described examples of successful tropical living in such wet lowland regions as Trinidad, Nicaragua, Ecuador, and the Northeast of Brazil. In Barbados white laborers did most of the hard work of the colony during the first few generations, and survived in spite of the lack of all modern aids produced by science. Price arrives at the conclusion that the chief reason for the failure of white settlement in Barbados, as well as in many other parts of the West Indies, was the importation of the Negro.

> It is usually said that the introduction of this race was due to the necessities of the environment and that the Negro was a hardy exotic, admirably equipped for the tropics, whereas the white was a tender, unsuitable plant. Yet other factors enter the picture. The planters could force the Negro to work on an economic and social level that entailed the degeneracy or emigration of white workers, and for the first few centuries the black was sufficiently backward, weak, and docile to suffer this exploitation (205).

The white people in many parts of the West Indies survived for many generations, performing their own work; and on certain islands small white groups still exist, having maintained their race free from Negro

mixture. There is, however, no example, says Price, of the white man's successful resistance in the tropics to the competition of races of lower economic and social status. It seems to be a well-established principle of population that the standard of living seeks the level of the lowest component, so that the presence of a large population of Negroes tends to lower the standard of the whole low-income group.

Today the predominantly black population of Barbados makes a very intensive use of the narrowly restricted land area. Sugar cane is still the chief crop; but in Barbados the cane is planted from seed, and after the first and largest harvest, it is not permitted to remain in the ground to produce diminishing harvests, as is commonly done elsewhere. A more or less regular rotation is therefore possible, with maize, yams, bananas, cotton, and a variety of vegetables for the other crops. There are both large and small properties on the island, with a tendency to reduce the number of mills by setting up modern large-scale equipment. Before the First World War there were 440 mills; now there are barely half that number. The chief export consists of syrup and fancy molasses for the North American market.

In the modern era the European possessions in America are, with a few exceptions, financial liabilities rather than sources of wealth for the home countries. These possessions in the West Indies have, however, assumed a new significance in terms of military and naval strategy. Barbados is of special importance in this respect, for not only is it a refueling station for ships, and an air base, but also it is a junction point at which many of the transoceanic cables are brought together.

OTHER BRITISH POSSESSIONS

The other British possessions in the West Indies are all small. On all of them the population is predominantly Negro, and the Negro element is increasing while the proportion of whites is gradually declining (278).

THE BAHAMA ISLANDS

The Bahama Islands form the northern fringe of the West Indies where some 3,000 separate pieces of land, most of them uninhabited low reefs, rise above the shallow platform north of Cuba and east of Florida. Most of the Bahamas are too low to receive much rainfall, and they are covered with a scrub of pine and palm, similar to the vegetation of much of Florida. Although one of the islands, known today as Watling Island,

is supposed to have been the first part of America to be sighted by Columbus, the islands were left uninhabited until a small group of pirates and outlaws sought refuge on them. In 1718 the British claimed the whole group, chiefly because of their very great strategic importance with reference to the Caribbean.

At the present time the Bahamas have a population of about 67,700 people, grouped on twenty of the islands. A quarter of this number are on New Providence Island, on which the capital, Nassau, is located. Until 1930 the Bahamas were of considerable importance because of the sponge fisheries, but this industry was hard hit by the depression, and by diseases which have since attacked the sponge beds. Today the leading export of the Bahamas is tomatoes. But the chief economic support of the colony is the winter tourist business: year by year Nassau is attracting larger and larger numbers of people from the United States.

THE LEEWARD ISLANDS

The administrative division of the British West Indies known as the Leeward Islands Colony includes the British Virgin Islands, Anguilla, Sombrero, Barbuda, St. Christopher (or as it is usually called, St. Kitts), Nevis, Antigua, Redonda, and Montserrat (Maps 142 and 143). The islands of Sombrero and Redonda are too small to support any important number of inhabitants. The other islands of the Leeward group, together with data regarding their population, are presented in the following table (278):

THE LEEWARD ISLANDS

Island	*Chief Port*	*Estimated Population in 1938*	*Population Density*
British Virgin Islands	Roadtown	6,364	95
Anguilla	. . .	5,717	168
Barbuda	. . .	900	. . .
St. Kitts	Basseterre	17,886	263
Nevis	Charlestown	13,966	264
Antigua	St. John's	34,123	316
Montserrat	Plymouth	13,670	427

The British Virgin Islands are utilized principally for cattle grazing and for small plantations of cotton. Some of the inhabitants are engaged in fishing, and some in the preparation of charcoal from the scrub forests found in certain parts of the islands.

Anguilla and Barbuda are both low islands (Map 142), the latter being mostly less than five feet above sea level. They are both formed on coral limestone and have no surface water; as a result supplies of water for drinking must be caught from the rain. On both islands farming is precarious because of uncertain rainfall. From 1691 until 1872 Barbuda was the private property of the Codrington family, which also had large estates in Antigua. The island of Barbuda was a hunting preserve.

St. Kitts is used for the cultivation of sugar cane, and its chief exports are sugar and molasses. It has one modern sugar mill. Nevis, which at first shared in the production of sugar with St. Kitts, found itself outdistanced by the latter island as a result of this new mill. The people on Nevis have turned to the production of sea-island cotton, which is now their chief export. On St. Kitts the land is mostly held in large estates, and the agricultural laborers work for wages; Nevis, on the contrary, is mostly divided into small farms, and worked by the owners or by share croppers.

Antigua is also a sugar island, and its major exports are sugar, molasses, and rum. Like Barbuda it is low-lying, and consequently it is not cloud-capped during most of the day like the islands which are mountainous, and its rainfall is barely sufficient for crops. In fact, a considerable part of Antigua is too dry for the cultivation of sugar cane, and the plantations are restricted to one part of the island where there is a clay soil, retentive of moisture. Where cane can be grown, it is found to have an exceptionally high sugar content because of the many hours of brilliant sunshine under a cloudless sky. Much of the food supply of the people of Antigua is raised on the land which is too dry for cane.

Montserrat produces sea-island cotton, tomatoes, and limes. Most of its lands are divided into small properties and worked by share croppers. In addition to the export crops, the land is used for the production of food for local consumption; in some years there is a surplus of foodstuffs to be sent to St. Kitts.

THE WINDWARD ISLANDS AND TOBAGO

The Windward Islands Colony of Great Britain includes Dominica,[1] St. Lucia, St. Vincent, Grenada, and the Grenadines. Tobago is politically attached to the crown colony of Trinidad and Tobago. The population data for these islands are given in the following table (278):

[1] Dominica was transferred from the Leeward Islands Colony to the Windward Islands on January 1, 1940.

THE WINDWARD ISLANDS AND TOBAGO

Island	*Chief Port*	*Estimated Population in 1938*	*Population Density*
Dominica	Roseau	50,617	166
St. Lucia	Castries	69,084	309
St. Vincent	Kingstown	58,381	389
Grenada and the Grenadines	St. George's	88,201	665
Tobago	Scarborough	25,358	241

Dominica is a very rugged, mountainous island—so rugged, in fact, that no road crosses the interior, and settlements are mostly limited to a fringe around the coast (273). The coast itself is mostly cliffed and has few indentations. Coffee which might be raised on the mountain slopes, and which was raised there during the eighteenth century, is of no importance today. Nor is sugar cane grown on Dominica any longer. Lime plantations provide the chief exports (fresh fruit, juice, lime extract, and lime oil). In addition to limes several other tree crops provide exports: bananas, coconuts, oranges, bay oil, cacao, mangoes, grapefruit, and several others. Production is mostly in the hands of small proprietors, who raise, in addition to the tree crops, small but sufficient quantities of food for the local needs.

St. Lucia's chief product is sugar; the cane is grown on four large plantations, and to a minor extent by small planters in the vicinity of these plantations. In addition to sugar St. Lucia also produces limes, bananas, coconuts, cacao, and mangoes. These items, also, are mostly grown on large estates. St. Lucia possesses one of the most secure harbors in the West Indies—Port Castries near the northwestern end of the island.

St. Vincent has long been known as the world's chief producer of arrowroot, a plant used in the preparation of patent medicines. In addition it now produces cotton, coconuts, bananas, sugar, molasses, rum, and cacao. Most of the good cropland of St. Vincent is held in large estates and worked by share croppers or hired laborers. Like most of the islands where large properties predominate, the local food supply must be supplemented by imported items, such as flour, rice, and salt fish.

From Grenada the chief exports are cacao, nutmegs, mace (an aromatic spice), bananas, lime oil, and cotton. Most of these products are grown on large plantations with the necessary labor of cultivation, preparation, and shipment performed by wage workers. But on the island as a whole

small farms occupy more area than the large estates; and on the small farms an abundant local food supply is produced.

On the inhabited parts of the Grenadines the land is used to grow cotton and subsistence foods, while the local diet is supplemented by fishing.

Tobago, which belongs geologically to the South American continent and politically to Trinidad, is a mountainous and densely wooded island. Around the coast there is a fringe of plantations on which the chief products are cacao and coconuts.

THE FRENCH POSSESSIONS

France's possessions in the West Indies were formerly more numerous than they are today. Before the downfall of Napoleon, French authority extended at one time or another over almost all of the islands from Hispaniola to Tobago; and on Trinidad, which never came under French rule, there are, nevertheless, many people of French ancestry. Now only four chief islands remain out of this great colonial empire. The French own the eastern two-thirds of St. Martin, and all of St. Barthélemy, Guadeloupe, and Martinique. Near Guadeloupe are the smaller islands of Désirade, Marie Galante, and Les Saintes. Of these, the low islands of St. Martin and St. Barthélemy, which suffer from inadequate supplies of water, have only small settlements. Guadeloupe and Martinique, on the other hand, have dense populations. The former, which has an area of about 580 square miles, has a population of more than 300,000—an average density of 442 people per square mile. Martinique, which has only 385 square miles, and a population of nearly 250,000, has an average density of 640 people per square mile. Population data for the French possessions are given in the following table (278):

THE FRENCH WEST INDIES

Colony	*Estimated Population in 1938*
St. Martin	4,284
St. Barthélemy	2,519
Guadeloupe	304,239
Désirade	1,558
Marie Galante	15,182
Les Saintes	1,765
Martinique	241,000

St. Martin, which was occupied by both the Dutch and the French in 1648, was divided between these two powers. The island produces only small quantities of sugar, cotton, fruits, and foods for local use. St. Barthélemy, like St. Martin, is a very dry island of almost no economic importance. It raises some cotton, maize, manioc, and pineapples, and is used for the grazing of cattle and goats.

Guadeloupe consists really of two islands: to the east is low-lying Grande-Terre, with an area of some 219 square miles; and to the west, and separated by a narrow tidal channel filled with mangrove, is Basse-Terre, with an area of 364 square miles. Basse-Terre, in spite of its name, is very rugged and mountainous, and its volcanic peak, Mt. Soufrière, 4,869 feet in elevation, is the highest mountain in the Lesser Antilles. The population of Basse-Terre is concentrated in a string of settlements along the coast.

Grande-Terre has long been known chiefly as a sugar-cane island. Its generally level limestone surface would be ideal for cane production were it not for a rather uncertain rainfall and for the recurrence of hurricanes. Nevertheless, sugar and rum are the leading products, and about 20 per cent of this part of Guadeloupe is used for cane production. The land is held in large estates and most of the people are agricultural wage workers.

Basse-Terre receives much more rainfall, but only a small proportion of its land is level enough to permit cultivation. Its products are bananas, coffee, cacao, and vanilla. The political center of the French West Indies is at the town of Basse-Terre near the southwestern end of Guadeloupe; but for a long time this place has been much smaller than the chief commercial town of Guadeloupe, Pointe-à-Pitre, located on the southern side of Grande-Terre. The latter place suffers from the fact that its narrow harbor is entirely exposed to hurricanes which sweep in from the southeast.

Each of the three small islands near Guadeloupe has marked peculiarities to distinguish it from the others. Désirade is a low-lying limestone island which is too dry for sugar cane, and is used principally for cotton and henequen. Sheep are pastured on the places suited not even to these drought-resistant crops, and the food supply is partly derived from fishing. Marie Galante is also a low island, but it receives just enough rain to support plantations of sugar cane. Les Saintes are formed by the nearly submerged peaks of volcanoes. Most of the inhabitants make their living from fishing and from the manufacture of charcoal.

Martinique, like Basse-Terre, and also like Dominica, is a rugged, mountainous island. It is 35 miles long by 13 miles wide, and includes along its coast several well-protected harbors, such as the one on which Fort-de-France is situated. Its older volcanoes are now deeply dissected by torrential streams, but the young Mt. Pelée, near the northern end of the island, which erupted with great violence in 1902, has all the forms of a newly built volcanic cone. St. Pierre, north of Fort-de-France, was one of the major ports of the West Indies before the eruption of Mt. Pelée; this whole section of the island, however, was utterly devastated by that catastrophe. But this is not the only natural calamity which has disturbed the peace of Martinique. In 305 years there have been 33 hurricanes, 7 earthquakes, 5 serious conflagrations, 2 famines, 1 drought, 11 storms with tidal waves, and 3 volcanic eruptions (278). Martinique has averaged one disaster in almost every five years, which, in so densely populated an island, causes much distress and poverty.

Alcohol and rum are still the chief products of Martinique. Sugar cane was introduced from Brazil in 1654, and by the beginning of the eighteenth century this colony had become one of the most wealthy of the sugar islands. At the present time something like 80 per cent of the better lands are devoted exclusively to cane. The Plain of Lamentin, bordering the Bay of Fort-de-France, is the only extensive area of level land in Martinique. It is covered with cane fields and is entirely devoid of habitations or of lands used for subsistence crops. Cane is also grown along the windward northeast coast. Almost all the cane lands are held in large estates. So specialized is the interest in sugar planting, that no other commercial crops have ever received much attention in Martinique. Coffee, cacao, cotton, vanilla, bananas, and pineapples have been introduced at one time or another, but none of these other forms of commercial agriculture has been successful. One of the chief products derived from the sugar is rum, and in France rum from Martinique has a very high reputation.

THE NETHERLANDS POSSESSIONS

The islands of the West Indies which remain in the possession of The Netherlands are in two widely separated groups. In the north there are the western third of St. Martin, Saba, and St. Eustatius (Map 142). Along the northern coast of Venezuela (Map 12) there are Aruba, Curaçao, and Bonaire. The population data for these islands, for 1870, 1915, and 1938, are given in the following table (278):

POPULATION OF THE NETHERLANDS ISLANDS

Colony	*1870*	*1915*	*1938*
St. Martin	2,853	3,202	2,202
Saba	1,832	2,488	1,209
St. Eustatius	1,890	1,431	1,121
Aruba	3,792	9,204	28,155
Curaçao	20,844	33,677	62,798
Bonaire	3,816	6,592	5,536

The northern islands are of slight economic importance and have only small populations. Some little cotton is grown on St. Martin and St. Eustatius. The island of Saba, which is a simple volcanic cone rising 2,887 feet above the sea has long been of interest because of the contrasted population groups living inside the long since inactive crater. The island comprises an area of only about five square miles. It rises abruptly from the water's edge with steeply cliffed slopes, leaving no protected anchorage around the shore. Within the crater there are several little villages, each containing a few hundred people. For a long time Saba was fairly prosperous in spite of the difficult accessibility of its settlements. The population remained predominantly white, although it was served by a small group of Negro slaves. The chief economic activity on the island was the construction of small sailing boats to be used for communications among the islands throughout the West Indies. The boats were built near the towns, and then lowered into the sea with ropes. The liberation of the slaves in 1863, and the gradual change to steam boats brought an end to the unique function of Saba. Now the proportion of the black population is increasing at the expense of the white.

The three Netherlands possessions off the coast of Venezuela have already been mentioned in the section on Venezuela. They are Aruba, Curaçao, and Bonaire. Aruba and Curaçao are the only islands of either group which increased in population between 1915 and 1938; these are the islands on which a very large proportion of the oil from Maracaibo is refined. The large North American and British oil companies have established plants on Aruba and at Willemstad on Curaçao, and now, more recently, on the Peninsula of Paraguaná in Venezuela. The population of Aruba and Curaçao is almost entirely urban, and outside of the chief city of Willemstad (60,000 inhabitants) and the refineries, the rest of the islands are, like Bonaire, very scantily occupied, and used mostly for the grazing of goats. The rainfall is too low to permit the cultivation of crops except on a very few favored sites.

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EUROPEAN POSSESSIONS ON THE MAINLAND OF SOUTH AND MIDDLE AMERICA

THE GUIANA COLONIES

ISOLATION from the main routes and centers of Spanish and Portuguese colonial settlement explains the survival of the European possessions in the West Indies. The British, Dutch, and French colonies in the Guiana region also owe their survival to isolation, for these colonies are located where the wide zone of scantily occupied country which separates the Spaniards from the Portuguese in South America reaches the northeast coast (Map 1).

Only in theory were the Spanish and the Portuguese realms in the New World divided by the arbitrary north-south line described in the Treaty of Tordesillas. The areas of concentrated population in the Spanish domain and those in the Portuguese domain were actually separated and have remained separated to the present day by a wide zone of very scanty settlement; through this zone pass the present boundaries between Brazil and the several countries descended from Spain. In the south, to be sure, Spaniards and Portuguese did establish contact in Uruguay. But Rio Grande do Sul is the only Brazilian state in which important border settlements are in close proximity to the border settlements of neighboring countries. The thinly settled zone outlines the eastern and northern parts of Paraguay, the eastern parts of Bolivia, Peru, Ecuador, and Colombia, and the southern part of Venezuela. Where the zone of scanty

settlement comes out to the northeast coast of the continent it was successfully invaded by the other European nations, and the colonies they planted were never exposed to serious pressure from the Latin Americans.

The reasons for the persistence of this zone of separation should be reviewed briefly. Fundamentally, of course, such a zone remains after four centuries of settlement only because of the relatively small population of the continent and the generally low rate of population increase. Nevertheless, the Portuguese bandeirantes from São Paulo did extend their exploration and establish their peculiar way of life over the vast area of the Brazilian sertões (Map 5). Since their movement toward the west and toward the north was not stopped by contact with the Spaniards coming from the other directions—as was the case on the shores of the Plata—one may well search for the forces which did stop them. Certainly it was not distance from a base, for the bandeirantes in a sense carried their base with them, establishing temporary settlements wherever grazing and agricultural prospects seemed satisfactory. On the Spanish side of the continent, one can scarcely speak of the Andes as the barrier which stopped eastward penetration, for in many places the Spaniards crossed and maintained communications across a much wider zone of rugged country. One feature of the physical earth, however, did tend to stop both the Spaniards and the Portuguese: it was not distance; not heat or cold; not pestilence; not steep mountain slopes; and certainly not warlike Indian tribes. It was the forest.

For a people with the background, the attitudes, and the technical knowledge of the Spaniards and the Portuguese, a great significance is attached to the presence of dense woods—precisely the opposite significance which was attached to such woods by the English pioneers. The forests of the Paraná Valley, the forests of the Chaco, the forests of the Amazon and its tributaries—these were the barriers that stopped the bandeirantes; the forests of the eastern Andean slopes, and of the Guiana region discouraged the Spaniards from pushing east or south to the limits theoretically established for them by the treaty with Portugal. To this general statement the amendment should be made that almost any barrier can be crossed if the incentive is sufficient. The Portuguese crossed the belt of coastal forest to occupy the highlands; the Spaniards cleared their way through the jungles of Panamá or the lowlands back of Veracruz. But forests in a remote location, distant from the centers of settlement, and scantily occupied by Indians, could exert the maximum influence on Spanish or Portuguese colonial activities.

To the people from northern Europe, however, the forest was no barrier.

Attempts to gain a foothold on the eastern coast of South, Middle, and North America were made by the French, the Dutch, and the British at various times and places. Most of the attempts were beaten off, and the invaders were forced to retreat—the French from Rio de Janeiro, the Dutch from the coast of the Northeast of Brazil, the British from Buenos Aires. But in the woods of eastern North America both the French and the British were successful in planting a number of colonies; in isolated British Honduras a European colony survives; and in the isolation of Guiana, the British, Dutch, and French have all maintained their colonies.

THE LAND

Guiana, as a regional name, is commonly applied to an area which is entirely surrounded by water. The several water bodies which form the outlines of Guiana are the Orinoco River, the Río Casiquiare which drains part of the water from the upper Orinoco southward to join a headwater of the Rio Negro, the Rio Negro itself, the Amazon, and the Atlantic Ocean (Map 6). This territory is divided politically into Venezuelan Guiana, Brazilian Guiana, British Guiana, Dutch Guiana, and French Guiana.

This region lies only a short distance north of the equator, and almost exactly on the heat equator, that is the part of the earth with the highest average annual temperatures. Behind a flat, swampy coast, the Guiana Highlands are composed of the same basic elements as the Brazilian Highlands on the southern side of the Amazon. Almost all the surface is covered with tropical rain forest except for narrow belts of wet savanna along the coast, and dry savanna which crosses the border from the Rio Branco area of Brazil into the interior of British Guiana (Map 7). With the exception of the fringe of settlement along the coast, most of Guiana is very scantily inhabited (Maps 1 and 107).

Surface Features

As we have said, the three basic elements which combine to form the Brazilian Highlands are also found in Guiana (Map 104). There is a crystalline hilly upland developed on granites and gneisses which are deeply weathered. Above the hilly upland there are massive mountain groups, formed where the rocks are somewhat more resistant to the processes of denudation in the rainy tropics. And also above the hilly upland stand the plateaus upheld by resistant horizontal layers of sandstone.

The low mountains which rise with steep sides but rounded tops above the crystalline hilly upland are found mostly in Dutch and French Guiana and along the border of Brazil. The *Tumac-Humac Range*, some 3,000 feet in altitude, forms an almost continuous line of division between the streams which flow directly to the Atlantic and those which drain first to the Amazon; this drainage divide makes a convenient and easily distinguished feature on which to establish the boundary between Brazil and the colonies of France and The Netherlands. North of this range there are several mountain groups and isolated cone-shaped peaks which in Dutch Guiana reach altitudes above 4,000 feet.

The sandstone plateaus are found in the western part of Guiana, especially in Venezuela. The highest elevation in the whole region is Mt. Roraima, located where the borders of Venezuela, Brazil, and British Guiana come together. Mt. Roraima, 8,635 feet in elevation, is not really a mountain at all in the exact meaning of the word; it is a flat-topped plateau, bounded by steeply cliffed sides. The rivers which rise on the sandstone plateaus in western British Guiana fall over the scarped sides in magnificent waterfalls. The Kaieteur Falls, where the Rio Potaro, a tributary of the Essequibo, drops 741 feet down from the sandstone to the crystallines is one of the highest falls in the world.

The rivers which descend from these mountains and plateaus and cross the crystalline hilly upland toward the Atlantic are all interrupted at frequent intervals by falls and rapids. Only short stretches of water are navigable, and these only for shallow-draught boats and canoes. The Oyapock, the Maroni, the Suriname, the Courantyne, and the Essequibo are all barred to navigation at the inner margin of the coastal plain where these streams come tumbling down over the crystallines.

The Guiana Coast, on the other hand, is low and swampy. The vast quantity of silt transported by the Amazon is carried far out to sea by the enormous current of fresh water, discoloring the ocean for as much as two hundred miles offshore. The prevailing current runs from southeast to northwest along the coast, and this sweeps the load of alluvial material along the Guiana Coast where it is deposited in bars. Sand bars running parallel to the coast are backed by marshy lagoons into which the ocean water penetrates at high tide; the rivers meander across the belt of marshes and empty into the sea through openings in the bar.

These lowlands are widest in Dutch Guiana in the valley of the Suriname. They become narrower both toward the Orinoco and toward the Amazon. West of Paramaribo, capital of Dutch Guiana, the coastal

zone is a little more than fifty miles wide, but along the Maroni, on the border of Dutch and French Guiana, it is only about fifteen miles wide.

Climate and Vegetation

The climate of the Guiana Coast is equatorial. A line drawn through the stations having the highest average annual temperatures, but not the highest extreme temperatures, follows the Caribbean Coast of South America, passing through Maracaibo, La Guaira, and other points in northern Venezuela. It then crosses the delta of the Orinoco and follows the coast southeastward to about latitude 5° north of the equator, where it crosses the Atlantic toward Africa. The climate of Georgetown, capital of British Guiana, is representative of the climatic conditions of the whole coastal region. At Georgetown the average annual temperature is 80.6°, ranging from an average of 82.2° in the hottest month (September) to an average of 79.3° in the coolest months (January and February). As is characteristic of equatorial stations, the range between day and night, which is about 10°, is greater than the range between the coldest and warmest months. Except for the highest elevations of the interior, the altitude of the highlands is not enough to lower the temperatures significantly. In the Guianas people must adjust themselves to monotonously high temperatures—temperatures which are never excessively high, but which are never lowered by spells of cool weather.

The rainfall and humidity are also high. At Georgetown the average annual rainfall is 87.8 inches. Most of the rainfall is during a long rainy season extending from December to July, with two maxima, one in December and one in June. A short season of less rain occurs from August to November, during which, since there is less cloudiness, the temperatures are higher. The winds throughout the year come from the northeast, bringing large quantities of moisture from the warm waters of the Atlantic. The relative humidity at Georgetown averages 79 per cent. Nevertheless, the constant winds which sweep over the coastal region make life quite comfortable in spite of the humidity.

The vegetation cover is mostly a heavy rain forest (Map 105). The wet savanna along the coast is the chief interruption of the forest; it occupies the lagoons and tidal marshes, or the river floodplains subject to more or less regular inundation. The beginning of the crystalline hills, and many parts of the inner side of the lowland are covered with forest in which there are few natural openings. The forest covers the crystalline low mountains, leaving only some of the drier parts of the

sandstone plateaus in dry savanna. Along the headwaters of the Essequibo and the Branco, which drains southward toward the Amazon, there is a wide belt of dry savanna, known as the Rupanuni Savanna,—a continuation of the Rio Branco savannas of Brazil. As is common in dry savannas, the rivers are followed by a fringe of galeria.

THE EUROPEAN SETTLEMENTS

The first people to carry on a successful colonization of the Guiana Coast were the Dutch. The Spaniards had visited the area, searching always for El Dorado; but they found there no easy access to the interior, no large groups of friendly Indians with stores of accumulated treasure, and no known sources of gold. Only the forest stretched interminably back from the river banks covering a virtually uninhabited, and to the Spaniards uninhabitable, country. But the Dutch as early as 1596 established a post on the Essequibo as far inland as their ships could sail, and along the banks of the river around this post they attempted the planting of tobacco and sugar cane. Before long it was found that better conditions were offered along the immediate coast. Stabrock, today known as Georgetown, was settled early in the seventeenth century.

The use of the lands along the immediate coast, however, involved a number of difficulties. Chief among these was the necessity of draining the lagoons into the ocean, which here has a considerable tidal range. In this sort of work the Dutch were quite at home. With the aid of gates which could be kept closed at high tide, the lowlands on the inner side of the sand bar were drained and the rich alluvial soil was made available for the planters. Plantations began to spread in a narrow zone along the coast in either direction from Stabrock, some even being laid out on the northwestern side of the mouth of the Essequibo. Very soon the settlers beyond the Essequibo met opposition from Spaniards who came from the Venezuelan outposts on the Orinoco, and who vigorously resented the presence of the Dutch. The Dutch authorities, wishing to avoid trouble, closed this part of the coast to further settlement, permitting those already established there to remain. Settlement thereafter spread southeastward toward the Courantyne River.

Meanwhile, the English had established a colony at Paramaribo, a short distance up the Suriname River, and in 1626 the French settled at Cayenne. These two groups of settlers, unlike the Dutch, were not familiar enough with the drainage of low coasts to undertake engineering works. The English sugar plantations were restricted to the small spots

of higher ground along the river; and the French took advantage of the one place along the coast where a low ridge borders the sea. In 1667 the Dutch, who thought they could develop the Suriname settlements as prosperous revenue-producing sugar lands, accepted this English colony in exchange for their foothold on Manhattan Island at the mouth of the Hudson River, which seemed to offer little possibility of quick financial returns. For various reasons none of the Guiana colonies prospered. Perhaps the chief of these reasons was the ease with which run-away slaves could find refuge in the forests of the interior. Compared with the islands in the West Indies, the coastal settlements of Guiana were decidedly unattractive. Nevertheless, they were valuable enough to cause the British to seize both the French and the Dutch colonies during the first decade of the nineteenth century. Finally the present division of the territory between the three European nations was agreed upon in a series of treaties between 1812 and 1817.

During the whole period of British, Dutch, and French colonization in Guiana, the settlements between the Oyapock and the Essequibo went unmolested by either the Spaniards or the Portuguese. Beyond these rivers, the Latin Americans were more aggressive: the Spaniards pushed back the Dutch when they threatened to approach the mouth of the Orinoco; and the Portuguese pushed back the French from the mouth of the Amazon.

British Guiana

The present colony of British Guiana has a population of about 337,000 people. Of these, only about 3 per cent are white, four fifths of them of Portuguese ancestry. A variety of other races make up the great majority of the inhabitants: 42 per cent are East Indians; 38 per cent are Negroes; 12 per cent are described as "mixtures"; about 3 per cent are native Indians; and about 2 per cent are Chinese and others. This variety of racial composition is the result of repeated attempts to solve the labor problem by bringing in workers under contract, many of whom have remained after the expiration of the contracts. But the unstable markets for tropical products, and the lack of a sufficient labor supply have presented problems which have never been permanently solved. No long period of real prosperity has ever come to British Guiana.

Out of some 90,000 square miles of area, only 198 square miles are under cultivation. Along the coast, mostly southeast of Georgetown (a city of about 68,000), there are twenty-four large estates which produce

most of British Guiana's leading crop, sugar cane. Many small farmers on abandoned sugar-cane plantations or on newly drained portions of the lagoon lands raise subsistence crops, among which rice is of chief importance. In addition to sugar cane, there are smaller acreages of coconuts and cacao.

The interior of British Guiana is still very sparsely inhabited. Short railroad lines which link various navigable stretches on the larger rivers make it possible to travel far back from the coast, and to ship out items with a high value per unit of weight. From the forests of the interior come cabinet woods and balata; and from the stream gravels in many small localities come gold and diamonds. But the most important activity in the interior is the mining of bauxite, the source of aluminum. A North American company has developed two chief mining areas—one along the Demerara River, which flows out to Georgetown; the other along the Berbice River, which flows out to New Amsterdam. Bauxite is formed by the weathering of certain minerals contained in the crystalline rocks; it is found in the unconsolidated soil material which mantles the surface of the crystalline hilly uplands. Mining is very simple, but since the refineries are located in North America a considerable volume of shipping is necessary to carry the ore. From this source and from similar workings in Dutch Guiana, the United States derives some 93 per cent of its imports of aluminum ore. Small and scattered settlements along the rivers are supported by bauxite mines. Altogether, this activity gives employment to about a thousand people.

Dutch Guiana, or Suriname

Dutch Guiana, or Suriname, has a population of about 178,000, of which not more than 2,000 are white. Here again the inhabitants include many different races. The largest number, perhaps 66,000, are Negroes and mulattoes; but the statistics make a distinction between Negroes living in the settled areas, and so-called "bush Negroes" of the interior. There are estimated to be about 17,000 of the latter—scattered groups of shifting cultivators who live in the forests of the interior to which their ancestors escaped during the slave days. There are also 42,000 East Indians, 34,000 Javanese, and some 2,000 Chinese in the colony. The chief city of Suriname is Paramaribo (55,000 inhabitants).

The total cultivated area of Suriname is about 150 square miles. There are fifty-one large plantations which produce sugar, rice, coffee, and oranges. They are located, like those of British Guiana, along the imme-

diate coast. In the interior there is little development, and there are almost no fixed settlements. From the forests come cabinet woods and balata, and there is a small production of gold and bauxite.

French Guiana

French Guiana is notorious as a prison colony, and as one of the most backward of all the inhabited spots in the Western Hemisphere. Since 1930 it has been divided into two parts: along the coast and extending inland for about twenty-five miles is the Colony of Guiana; the remainder of the interior is now known as the Territory of Inini. A census of the inhabitants taken in 1936 shows that in that year there were 30,906 free citizens and 5,628 convicts in the Colony of Guiana, and 6,099 people scattered through the interior in the Territory of Inini—making a total population of 42,643 people. Cayenne, the chief city, had a population of 11,704.

In the whole of French Guiana there are not more than thirteen square miles of cultivated land. There are small and poorly kept plantations of coffee, cacao, and sugar which provide almost nothing for export. Every year the inhabitants must be supplied by imports of essential foods. Such is the sad condition of neglect and hopelessness into which this European possession has descended. The penal colony, which has received so much publicity, is located on the Île du Diable (Devil's Island).

BRITISH HONDURAS

The only other European possession on the mainland of South and Middle America is British Honduras (Maps 118, 119, 120, and 121). This is the last remnant of the British holdings on the Caribbean side of Central America, which once extended as far south as the mouth of the Río San Juan in Nicaragua. The British claim to this eastern part of the Yucatán Peninsula was accepted by Spain in 1670. The territory comprises some 8,598 square miles.

British Honduras occupies the heavily wooded and very rainy Caribbean coast which the Spaniards avoided during the colonial period because of the unhealthful conditions they found there. The northern half of the area is low and swampy, crossed by numerous sluggish and meandering rivers, and with many offshore islands. The southern half of the colony is composed of hills and low mountains. Running across the border into northern Guatemala there is a range of mountains the highest peak

of which reaches an elevation of 3,700 feet. The southern coast is also bordered by a fringe of offshore islands and coral reefs, which provide numerous sheltered harbors deep enough for ocean-going boats. In the north the inland waters are too shallow to make good harbors, but south of Belize, the capital and chief city, the channels behind the reefs are not silted up.

Settlement of British Honduras

In 1938 the population of British Honduras was estimated to be about 57,700, less than 4 per cent of which was white. The remainder was made up of 48 per cent Negro and mulatto, 24 per cent Maya Indians, 8 per cent Carib Indians, and 16 per cent Spaniards and mestizos from Mexico and Guatemala. Belize has about 17,000 inhabitants.

British Honduras is chiefly a producer of such forest products as mahogany, chicle, cedar, rosewood, and logwood. The cutting of logs or the collection of chicle is carried on by wage workers who form no permanent settlements in the forests. At one time the whole coastal area, including the islands, was used for coconuts, but the lack of transportation facilities has forced the coconut planters to give up this form of enterprise in competition with planters on the more accessible islands of the West Indies. The food crops in British Honduras are insufficient to meet the needs of the inhabitants.

GENERAL CONCLUSION

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GENERAL CONCLUSION

LATIN America is not a new land. For more than four centuries various European peoples have been at work ransacking the world that Columbus discovered to claim and turn to a quick profit those resources stored over long periods of time by a bountiful nature—specifically the soils, the forests, and the minerals. El Dorado beckoned not only to the Spaniards and the Portuguese, but also to the British, the French, the Dutch, and more recently to the people of Germany, Italy, and the United States. All these varied groups have been at work in the varied lands of Latin America, each one guided by its own peculiar objectives, attitudes, and technical abilities. In the course of four centuries many of the now empty parts of Latin America have been searched, ransacked, and abandoned.

The people of the United States were also turning to quick profit the resources of a continent. As a result of the expansion of the original colonies across North America to the shores of the Pacific, the North Americans have reached a plane of material wellbeing, a standard of living, achieved by few other groups in the history of mankind. These standards were reached in part because of the energy and aggressiveness of the British people who were the original settlers; they were reached in part because these human qualities were applied to a land of superlative and favorably distributed resources which had been only thinly occupied and little exploited before the great westward movement began; and these standards were reached in part because this peculiar and unique

combination of human and physical qualities, of people and land, appeared at just that critical period in human history when mankind was making the first rapid application of the new productive techniques of science and engineering. Only slowly are the people of North America coming to a realization that the end of an era is at hand; only slowly are any important numbers of people appreciating the necessity for the conservation of resources, and the necessity for limiting and regulating the freedom of the individual in his use of the land. And only too willing are the people of North America to believe that the thinly occupied regions to the south of them contain more undeveloped resources waiting only for the magic touch of unrestricted private enterprise. There is serious danger in this mistaken concept. North Americans must somehow learn in time that the countries of Latin America are not just following their lead, about fifty years behind them. They must learn that Latin America follows a different road, toward different objectives, in the presence of very different problems of living; and they must agree to drop the use of the word "backward" to describe Latin America—for backwardness implies a judgment in terms of the North American way of living, and one cannot judge any civilization, any society, except in its own terms.

Our survey of Latin America brings to light the important fact that this part of the Western Hemisphere is, actually, composed of a great variety of kinds of land, a great variety of resources, some of them superlative, and—a matter of fundamental significance—is occupied by an extraordinary variety of peoples. The maps of population (Maps 1 and 144) indicate that the Latin Americans are very unevenly distributed in numerous isolated clusters, separated by large areas of only scantily occupied territory. Each of these clusters of people possesses its own peculiar individuality; each area of concentrated settlement differs from the others in the racial composition of the inhabitants, in the forms of economy, even in the attitudes toward life and in the objectives which the people set up as worth striving to reach. And in each of these areas the problems of living must be faced in the presence of a unique combination of the elements of the physical land. The general theme of diversity is illustrated again and again—not only by comparison between different countries, or between different areas of settlement, but also by the contrasts which separate the people occupying the land together in specific areas. There are no short cuts, no simple generalizations of wide application, which lead to a quick understanding of Latin America or of Latin Americans as a whole.

The Struggle to Establish Order

The struggle to establish order among diverse and discordant elements takes many different forms in Latin America. Such a struggle is not limited to the peoples of South and Middle America, for in any country, or any society, a continued effort is necessary to establish and maintain coherence and order. A society which assumes that such effort is unnecessary lies in grave danger of disruption at the first signs of stress. The maintenance of order is one of the objectives of government, one of the objectives of education, one of the objectives of religion. But in many parts of Latin America the racial and cultural elements which have been combined are so fundamentally divergent that to gain some kind of coherence, some kind of common objective in which a substantial majority of the inhabitants can enjoy a real participation seems all but impossible.

The problems to be faced differ widely in the various parts of Latin America. National coherence is amazingly difficult to establish in predominantly Indian countries, such as Mexico, Guatemala, Ecuador, Peru, and Bolivia. It is quite another thing in racially homogeneous countries like Chile and Paraguay. In some, like Uruguay, compactness of area eliminates a number of the difficulties faced by other countries in which the clusters of population are more widely separated. In many of the countries the most effective method of securing order seems to be through the operation of a military dictatorship, or some other form of strong central authority; but in Costa Rica and Colombia the political power, the rewards of economic activity, and the opportunities of gaining positions of prestige are open to a relatively large proportion of the population. Today both Costa Rica and Colombia might be described as democracies. Yet to use such a designation could be very misleading. For in none of the Latin-American countries does fascism, totalitarianism, communism, or democracy exist in exactly the European or North American sense. The use of these terms can bring only obscurity.

Obviously, then, Latin America is not a unit. The word "Latin" applied to America describes no common culture, no common race, not even a common language. It can be used to describe a geographical area, no small part of which is occupied by non-Latin peoples; and it can be used to describe the civilizations built by Spain and Portugal through the common historical experiences of colonization in a new land, of the subjugation of technologically primitive peoples already on the new land, and of the exploitation for quick profit of the resources of the new land.

PROBLEMS OF POPULATION AND SETTLEMENT

This survey of the interrelations of lands and peoples in the geographical area known as Latin America now makes possible a summary of some of the major conditions and problems of population and settlement. In spite of the existence of a few spots of dense settlement, the fact remains that Latin America as a whole is an area of relatively thin population, and between the several separate clusters of people there are great stretches of country in which there are very few permanent inhabitants. We come upon a curious chain of cause and effect relations: we begin with the fact that a relatively small population occupies a relatively large geographical area; this leads to a lack of sufficient labor or capital for the more intensive forms of land use, and so to the persistence of the methods of destructive exploitation; this brings us back again to the failure of the land to support more than a scanty population. This chain of consequences is illustrated strikingly in Brazil, but, with certain exceptions, is repeated with variations in all the different parts of Latin America. The exceptional areas, therefore, assume all the greater significance in giving perspective to the general problem of low population density, and the general failure of the areas of concentrated settlement to expand.

The Four Areas of Expanding Settlement

In all of mainland South and Middle America there are just four regions of settlement expansion. These regions are: 1. the highlands of Costa Rica; 2. the highlands of Antioquia in Colombia; 3. Middle Chile; and 4. the three southern states of Brazil. In each of these regions pioneer expansion is taking place around the margins of a nucleus of concentrated settlement: this frontier expansion is not accompanied by a decline of population in the nucleus; nor is the frontier expansion supported by any important immigration from outside of the region. There are other parts of Latin America where population is increasing, but where expanding frontiers are not found. There are places where the movement of population is toward the urban center rather than the rural outskirts; and there are islands in the West Indies, such as Haiti, Puerto Rico, Jamaica, and Barbados, where population increase is rapid, but which cannot develop the kind of pioneer expansion we are describing here because of the special conditions of island location.

No simple explanation can be found to provide a key to an understanding of this phenomenon of settlement expansion. Rather the

explanation is likely to be made up of the complex interplay of many factors, some of which defy exact measurement or even reasonably accurate description. In this respect, problems in the social sciences differ from those of the natural sciences, for in the latter the simplest explanations are regarded as most plausible, whereas in the former the simple explanations may almost always be regarded with suspicion. Detailed field studies are needed in each of the four regions to provide a careful description of the processes which have been, and are now at work. As an attempt to formulate this problem on the basis of the information now available, let us review the conditions of land and people in these areas, seeking especially those elements which they share in common.[1]

At least five factors must be considered: (1) There is the density and rate of increase of the population; (2) there is the racial and cultural character of the population; (3) there is the productivity of the land; (4) there is the accessibility of the pioneer zone to the outside world; and (5) there is the stability of the original nucleus of settlement.

1. *The Density and Rate of Increase of the Population.* Although the total number of people included within the four areas of expanding settlement is not large compared with Latin America as a whole, in each of the areas in question there is a relatively high density of population. The lowest density is in Southern Brazil, where there are perhaps 125 people per square mile. In the intermont basin of highland Costa Rica and in the valleys of highland Antioquia the density of the rural population is not much below 500 per square mile. In Northern Middle Chile, in the vicinity of Santiago, there is a rural density of 448 per square mile. But there are many other areas of settlement in Latin America with similar densities which are showing no tendency to expand.

In addition to a relatively high density in the nucleus of settlement, the population must have a high net rate of increase in order to support pioneer expansion. There can be no doubt that each of the four regions in question has a high net rate of increase, but what the rates are it is impossible to say. Census data in Latin America are notoriously inadequate for studies of this sort. Not only are the figures generally unreliable, and in many cases collected only for large areas not definitely outlined on maps, but also there are no countries where a succession of censuses at regular intervals permits the study of trends. Were it not for the effect of the rapid increase of population in expanding the areas

[1] The four regions of expanding settlement are treated on pages 100–105; 241–244; 251–252; 510–551; and 710–713.

of settlement—a phenomenon which can be seen on a map—these areas could not even have been identified.

2. *The Racial and Cultural Character of the Population.* The second factor in an interpretation of the phenomenon of expanding settlements is the racial and cultural character of the population. The facts seem to point to the conclusion that of the races present in Latin America, the white people and the Negroes are capable of maintaining a sufficiently high rate of increase to support settlement expansion, but that the Indian peoples are not. Of the four regions under discussion, three are occupied by people of unmixed European ancestry. Costa Rica and Antioquia were settled by colonists from Spain, and the three southern states of Brazil were occupied by Portuguese, Germans, Italians, and Poles. In all three of these regions there was only a very sparse native Indian population, and these natives were eliminated rather than absorbed by intermarriage. On the other hand, we must not forget the numerous colonies of pure Europeans in Latin America which have failed to expand. The Chileans seem at first to offer an exception to the pure European character of the inhabitants of the four critical regions; but we must remember that the Chilean mestizo has a large proportion of European ancestors, and that his Indian ancestors were the vigorous Araucanians. None of the concentrations of pure-blooded Indians show any tendency to expand. The Negro populations, on the other hand, do show capacity to increase rapidly under certain circumstances. The rate of increase in Haiti and Jamaica is notable. On the mainland, the population of the Cauca Valley in Colombia, which is predominantly black, is beginning to show signs of expansion into the Chocó, although this movement is not yet large enough to add this region to the four we are discussing.

A high birth rate is not only a racial matter; it is also a matter of culture, of inherited traditions of living. Some groups tend to produce large families, whatever circumstances they find themselves in. The factor of tradition is one which has been little studied, but which is of critical importance in this problem.

3. *The Productivity of the Land.* Productivity or habitability of land is the third factor to be considered. Productivity, as we have seen, is not determined by the physical quality of the land alone, but by the physical quality of the land measured in terms of the specific attitudes, objectives, and technical abilities of a group of settlers, in a particular kind of world economic system. We have already discussed this question in

Mexico and other countries. We have noted the changes in habitability which come with the change from hoe agriculture to plough agriculture. How much land in a country is arable? This question has no meaning until we know what kind of people are in the country, and what kind of use they propose to make of the land. Only when these things are known can we provide a map of the slopes, or of other physical qualities, which is of any importance in terms of the suitability of the land for pioneering.

Actually the physical conditions found in the four areas of expanding settlement are highly diverse. Two are located where the settlers must adjust themselves to the monotonous weather of the tropics, although at intermediate altitudes where the temperatures are always moderate. These two are in mountainous regions, and the settlements in each of them have today gone far beyond the borders of the basins or valleys in which the original nucleus was situated. The settlements of Southern Brazil are also in a country where steep slopes are common. Only in Middle Chile is the area of settlement actually located on gently sloping land, and here it is narrowly confined between the mountains and the sea. But in each case, land which is productive in terms of the uses which the settlers desire to make of it is available for new settlement.

4. *Accessibility.* The significance of the accessibility of a place to the outside world also changes with the changing attitudes of the settlers. Accessibility is, of course, partly a result of the physical difficulty of travel and partly the result of the labor and capital expended in the construction of routes and means of travel. But accessibility was of less significance in the period before the nineteenth century than it is today. Life, even in the towns, was relatively simple in the seventeenth and eighteenth centuries, and few were the essential wants which might not be supplied by local labor from local materials. Among the four areas of expanding settlement both Costa Rica and Antioquia were, in the seventeenth and eighteenth centuries, especially difficult of access from the outside world—yet they grew rapidly in population. Since the middle part of the nineteenth century, on the other hand, isolation has become intolerable, for it means that people are deprived of the countless materials and machines that make modern life more complicated and more comfortable. Isolation helps to explain the failure of the Pozuzo Colony, of the North American colony near Santarém, and of some of the Polish colonies in Paraná. In fact, in the modern period, a successful colony must not only occupy productive land, but it must also be easily

accessible to a market. The significance of the elements which produce isolation has changed notably with the changing attitudes and technical abilities of the modern period.

5. *The Stability of the Original Nucleus of Settlement.* The fifth factor in the interpretation of expanding settlements is the stability of the original nucleus. If expansion takes place without stability in the center, the result is a hollow frontier. To be sure, stability alone does not guarantee expansion, for there are many examples of notable stability, especially in the predominantly Indian communities, where no expansion has appeared. The question is, what are the processes of settlement in the four areas which have produced stability?

Why, for instance, did the colonists in Costa Rica form such a close attachment to the land? Why did the people around Cartago, finding themselves isolated in a land possessing no minerals and occupied by very few Indians, turn to subsistence agriculture on small farms? Was it a result of the location of the basin of Cartago in a place distant from any other source of wealth to which the colonists might have moved? Was it because the colonists formed a sentimental feeling for their new homes? Was it because of the eloquent example of some leader whose exploit remains unrecorded on the pages of history? Was it because the settlers of Costa Rica were distinctly different from those who went elsewhere in Spanish America? Or are all these and other factors so intricately interwoven that they will defy the ingenuity of scholars to unravel them? Here is a significant problem for the combined attack of several different social scientists.

And what about the colonists in Antioquia? There is considerable evidence that in this region we are dealing with an unusual group of people—a group in which newly converted Jews were numerous, and a group which was seeking isolation rather than wealth. From the evidence at hand it seems possible to explain the stability of the original nucleus of Antioquia on the basis of racial and cultural peculiarities.

The interpretation of the stability of settlement in Northern Middle Chile requires a very different approach. Here the predominant form of tenure was that of large private haciendas with tenant workers. Nowhere else in Latin America has this form of tenure led to pioneer expansion around a stabilized core. Yet in Northern Middle Chile the density of the rural population has been essentially static since about 1870, while continued increase of population has been absorbed in six different ways, one of which was the advance of the frontier of settlement into Southern

ownership of land—not of a small parcel of land on which the owner does his own work, but of large tracts of land on which the work is done by slaves, peons, tenants, or share croppers, according to the time and the place. Prestige is also gained by securing a commission in the army, or a position in the government, or in the priesthood. The struggle for political power in such a society is often fought out between two parties—the conservatives and the liberals: the conservatives include the landowners, the church, and the representatives of these groups in the army and the government; the liberals include the government officials, the army officers, and others who are opposed to the interests of the landowners. The persistence of the tradition of the large estate arises from the fact that the liberals, when successful, have attacked the power of the landowners through political changes rather than through changes in the system of land tenure. In only a few places—notably in Mexico and in Chile—has political revolt been directed toward an attack on the agrarian problem.

In a system of large estates the great majority of the people are landless workers. The profits of commercial production and the unearned increment coming from the increase of land values go to the relatively small minority who are owners, creating for this class a much greater wealth than is possible in a democratic system of peasant proprietors. Because the Spanish and Portuguese tradition emphasizes spiritual and artistic satisfactions rather than material gains, the aristocracy is more apt to spend money for so-called cultural benefits than to invest it in the hope of increasing productivity. In this respect the Spanish and Portuguese differ notably from the Anglo-Americans whose major ideal is the betterment of the material standards of life. One result in the pattern of settlement is the perpetuation of the system of large estates, the continued poverty of the majority of the people, and the failure of the areas of settlement to increase sufficiently to support a solid pioneer expansion.

The commercial plantations of the Portuguese, the Dutch, the French, the British, and the North Americans are operated primarily for the profit of the owners. This system does not constitute a way of living, as does the hacienda; it is a business enterprise, but one which involves the lives of millions of people. The system as such need not be condemned, for in many instances plantation owners recognize that in the long run the satisfactory support of the workers is a profitable objective. In other instances, however, the desire for quick financial returns through the destructive use of land includes no consideration of the social problems involved. Unfortunately the largest profits have not infrequently accrued

to those who could make use of slave labor, or its equivalent. Such has been the sad history of sugar planting in Brazil and in the West Indies. The plantation system, in general, being highly speculative and subject to great fluctuations of prosperity, has failed to provide the kind of stability necessary to form the basis of expanding settlement.

The Health Problem

The factors which lead to the widespread condition of poor health and malnutrition in Latin America are numerous. In Mexico we have discovered the serious dietary deficiencies which result from long-standing tradition, and similar problems await detailed description in many other countries of Latin America. Dietary tradition can be attacked only by education; and education is difficult to support where population is widely scattered in small communities of low density. Nevertheless, if there is any one point at which the whole vicious circle of scanty population and destructive land use can be effectively attacked it is in the problem of diet. Because of inadequate foods, and these prepared with little knowledge of hygiene, the incidence of disease in almost all the countries of Latin America is extraordinarily high. Lack of energy, lack of ambition to achieve better standards of living through more efficient work, the general prevalence of ignorance, superstition, and apathy—these all too common characteristics of the people in many parts of Latin America are not the result of tropical climate, or inherited racial inferiority. Again and again, in small areas, experience has shown that these same people, given adequate diet and protection from disease, can attack the problems of living with energy and efficiency. There is no evidence which permits us to subscribe hopelessly to the idea that the low latitudes are forever condemned to backwardness and poverty. But in the low latitudes the problems of disease and malnutrition are all the more important. The attack on disease thus far has been most successfully carried forward by the Brazilians and by the North Americans. Yet neither of these peoples has done more than touch the surface: the health problem still stands uppermost among the problems of settlement in such places as the Northeast of Brazil and Puerto Rico.

Immigration and Colonization

Can the problem of population in Latin America be solved through the development of a considerable movement of immigration and pioneer colonization supported by refugees from Europe? The rapid growth of

new settlement in the Argentine Humid Pampa and in São Paulo State, as well as the much larger growth in North America, which took place chiefly between 1850 and 1914, leads many students of population problems to consider the possibility of a renewal of the currents of emigration from Europe after the conclusion of the Second World War. Although it is not possible to forecast the political and economic character of this coming period—and without knowing these characteristics there can be no very definite discussion of the problem of new immigrant colonization in Latin America—nevertheless, it is possible to outline some of the factors which will be involved.

The question of the suitability of land is one which we need not repeat. Not until settlers are at hand can the full significance of the physical qualities of the land be determined. Since the conditions required for the development of expanding settlements, which we have already described, may be assumed to apply to colonies of future immigrants, we must face the conclusion that only a relatively small part of Latin America is really available for such colonization. The system of the large estates cannot be made to disappear by decree to leave the way open for small farmers. In terms of people per square mile there is ample room for a vast flood of new settlers in the Argentine Humid Pampa. Yet during the decade of the 1930's, when land was sought for the planting of new colonies in Argentina, only in the northern part of the Chaco was land to be found which was not in private hands and which was suitable for cotton. Any immigrant who arrives in Buenos Aires at the present time with sufficient cash to make possible the purchase of a small farm, can find ample opportunity to establish himself in the midst of the Humid Pampa—but immigrants do not come with cash in hand.

Studies of the possibilities of immigrant settlement in Latin America made just before the Second World War (115, 155) indicated that outside the northern part of the Argentine Chaco, the only important areas where land was available for new colonists at prices which the average immigrant could pay were in the southern states of Brazil—in western Paraná and Santa Catarina. Perhaps this region represents the largest area of such land in the whole world, but it is only a very small fraction of the vast thinly populated areas of Latin America. The advantages of this region, in addition to the availability of small farms at low prices, include the suitability of the land in terms of mixed farming with hogs as the cash product, and the accessibility of the pioneer zones to growing urban markets.

Schemes for colonial settlement elsewhere in Latin America are various

and involve even smaller areas. The Dominican Republic seeks immigrants to ward off the threatened eastward spread of the Haitians; the Venezuelans have established immigrant colonies at various places, chiefly in the Central Highlands. The interior of British Guiana was investigated as a possible pioneer area for refugee settlement. Meanwhile the great Amazon Basin remains so empty of human inhabitants that the development of tropical plantations on any important scale would seem to be a matter of extreme difficulty.

Furthermore, what large source of immigrants can be discerned? Throughout the Occidental world the tendency during the present century has been for people to move out of the rural areas into the cities. Modern technology has revolutionized the potential productivity of farm lands: there is no need today for new pioneer zones, for the land in use at present could easily be made sufficiently productive to satisfy the needs of all the world's inhabitants. Unless an opportunity for quick wealth in the pioneer zones of America is again widely advertised, as it was in Europe during the late nineteenth century, or unless large numbers of refugees are forcibly evicted, it is difficult to see how a movement of really significant size could develop. After the Second World War there will be plenty for the people of Europe to do, without undertaking the large-scale settlement of Latin America.

The factors which produce human migrations and those which determine the habitability of land are, in a sense, interactive. The same land which would yield great rewards for the settlers who come in large numbers, would offer only failure if the pioneers were too few. That unique period in world economic history which witnessed the rapid settlement of the grasslands of North America and Argentina, among others, has now been left behind. If rapid immigration is renewed, it will be the result of factors not now apparent.

COMMERCE AND INDUSTRY IN LATIN AMERICA

It was both a strength and a weakness of the great international system of commerce built chiefly by the English-speaking peoples before the First World War that almost any transaction between an urban-industrial center and a remote source of raw materials was of chief benefit to the people in the center. Not that the producers of raw materials did not profit from trade with the manufacturing cities, but in the end the urban people of the center derived much greater profit. As a result the material standards of living in the centers increased out of all proportion to the

standards which could be built up or maintained in the more remote places.

An example can be had in the economic history of Argentina. When the British invested their capital in the construction of railroads, the establishment of boat lines, and the building of industries in Argentina, they greatly increased the productivity and the economic activity of that country. Increased production means increased wealth and better material standards of living: Argentina's progress placed her far ahead of all the other Latin-American countries in terms of commercial development. But while Argentina moved ahead because of the increased value of her production, Great Britain moved much farther ahead. The proportion of increased productivity derived by Great Britain through the export of capital and of manufactured goods was much greater than the proportion derived by Argentina through the export of wheat and meat.

Little by little, however, people are beginning to understand that it is the *increase* of production and not the maintenance of production that makes such a system possible. Nineteenth-century capitalism was based on expansion—expansion of population, expansion of settlement into areas not previously considered to be highly productive, expansion of manufacturing plants, expansion of markets. When expansion slows down or ceases for whatever reasons the system begins to collapse, and efforts are made to protect the relatively high material standards built up in the centers by erecting tariff walls against cheaper goods from outside. Vaguely, now, people are sensing still another principle: that when expansion ceases, the maintenance of a high standard of living in one area or in one country is not possible as long as most of the world outside of that area or country has a much lower standard of living. Already it has been discovered that the currents of commerce flow more freely between two highly industrialized regions than they ever did between an industrial center and the sources of raw materials. Many people probably still regard the new industrialization in Latin America as another form of expanding market—a market for machinery and factory equipment. But in the long run the new industrialization will mean higher standards of living in Latin America; and only by raising standards in the rest of the world can the older industrial centers maintain the levels they have reached.

Industrial Development in Latin America before 1914

The first important development of manufacturing industry in Latin America did not occur until after 1880. Before that time, there were in

most of the towns small-scale factories and household industries, but large-scale enterprises were rare. In the period from 1880 to the beginning of the First World War a considerable number of large manufacturing plants were established—chiefly in Brazil, Argentina, Chile, and Mexico. Almost all the capital which built these industries was British; British managers resident in Latin America ran the businesses; and British technicians served as foremen. Protective tariffs were set up to protect the infant enterprises—in Brazil in 1879 and 1888; in Uruguay in 1888; and in Chile in 1897. During this period Argentina was the chief scene of activity, as frigoríficos and flour mills were built in the big ports, and as large shoe-manufacturing industries appeared in Córdoba, based on electric power. In Brazil the emphasis was on the textile industries, followed, however, by a wide variety of others based on local raw materials: leather and shoes, foodstuffs, glassware, paper, flour, and ironware. In Chile a big sugar refinery was built at Viña del Mar as early as 1871; and later the industrial structure was supplemented by flour mills, shoe-manufacturing plants, tobacco industries, and many others. Somewhat similar developments were appearing during this same period in Mexico.

Industrial Development since the First World War

This early industrial development, however, made little difference to the great majority of Latin Americans. Almost exclusively the new enterprises were in the hands of foreigners, and the wealthy people of the Latin-American countries took little interest in them. Prestige was still gained primarily through ownership of land, or position in the public service, not through success in business. If some of the new immigrants from across the water, like Francisco Matarazzo in São Paulo, were laying the basis of a new fortune in manufacturing and commercial undertakings, the wealthy coffee-growers remained uninterested.

But the First World War brought tremendous changes to Latin America; conditions in South America as described by James Bryce (28) in 1912 were no longer the same when Bryce's book was being widely read in the United States, about 1920. Not only were the markets for certain products made highly uncertain, but especially were the currents of import into South America disrupted. The lack of coal in Argentina led even to the use of maize stalks as fuel in the locomotives. Many items of manufacture which the wealthier people in South America had come to depend on could no longer be supplied from the foreign manufacturers. The result was an enormous increase in business with the

United States, and a great forward surge in the construction of domestic industries.

Before 1890, the United States had little commercial connection with Latin America. In that year, however, the first of the reciprocity treaties began to point the way to potential markets in the south. Shortly thereafter the changes in the West Indies resulting from the Spanish-American War, and the opening of the Panama Canal placed the United States in a predominant position in the trade of the Caribbean, and greatly increased North American interest in the more remote countries of South America. Yet at no time except when the normal channels of trade are disarranged by war is the commerce of the United States greater with Latin America than with the highly industrialized centers of Europe—especially with Great Britain. In the 1930's only about 12 per cent of the exports of the United States went to all of Latin America, as compared with 49 per cent to Europe; and only about a quarter of the imports came from Latin America.

Of great significance, however, are the North American investments in Latin America. The first great period of foreign investment came during the First World War and especially in the decade after it, between 1918 and 1929. Unfortunately, few North Americans were prepared for this new business orientation. Many investments were made unintelligently, owing to a dangerous ignorance regarding conditions in Latin America. Much of the money loaned was used by the governments which were in power to pay the army which kept them in power, or for spectacular public works which, however valuable to the countries themselves, brought no financial returns. The results of the worldwide depression of 1929 were twofold: the North American investor became unduly wary; and the Latin-American governments took excessive steps to guard against further increase of control by foreign bankers. Misunderstanding on both sides led to a most unfortunate condition of fear and mistrust.

North American direct investments in business enterprises in South America are still a major item. Of all the funds invested abroad by people of the United States, 52 per cent is in South America.[2] Of these investments, 32 per cent is in mining and smelting activities; 26 per cent is in public utilities, including hydroelectric developments; 24 per cent is in the petroleum business; 15 per cent is in manufacturing and

[2] Figures for 1936, from the "Conference on Economic Relations with Latin America," held at the Institute of Latin-American Studies at Ann Arbor, Michigan, August, 1939.

merchandising establishments; and 3 per cent is in a variety of other business activities. Investments in Middle America are chiefly in Mexican mines, and in Cuban sugar plantations. The following table gives the proportion of North American investments in the various countries of South America:

North American Direct Investments in South America*

(Percentage of South American total in 1936)

Country	Percentage
Chile	33
Argentina	24
Brazil	13
Venezuela	13
Colombia	7
Peru	6
All others	4

Since 1920 there has been a rapid increase of industrial activity in Latin America—as a result of the investment of both foreign and domestic capital. In Argentina the construction of new industrial plants was an important factor in averting the major force of the depression. The Latin-American industries have now reached the stage when commodities which are in wide demand and which can be manufactured by the simpler processes are supplied almost entirely by domestic manufacturers. Foodstuffs, textiles, shoes, and building materials such as cement, are now produced in the various countries; many North American industries have established branch plants in Latin America, especially in Buenos Aires, São Paulo, and Mexico City, where all sorts of machines and other modern gadgets are assembled, partly from local supplies of raw material. Since 1930, various kinds of government regulations restrict the control of these new industries more and more closely to citizens. The foreign control of businesses, or even the employment of foreign technicians is becoming increasingly difficult, especially now that there is a definite change of attitude toward business or engineering careers on the part of the Latin Americans.

Major Industrial Centers

Although this new industrial development, now being rapidly made a part of Latin-American life, is present in most of the larger cities of each country, it is concentrated chiefly in Brazil, Argentina, Chile, and

* *Op. cit.*

Mexico. In terms of energy used, Brazil is well in the lead, owing to the rapid industrial growth of São Paulo city. But in terms of energy per capita, Chile is the leading country of Latin America. The following quotation from Bain and Read presents these facts in striking form:

DAILY OUTPUT OF WORK

(In Millions of Horse-Power Hours)

	Human	*Coal*	*Petroleum*	*Water*	*Total*	*Daily Output Hp.-Hr. per Capita*
Chile . . .	1.5	2.0	3.8	1.0	8.3	1.90
Argentina .	3.6	4.5	10.0	0.4	18.5	1.69
Peru . . .	1.8	0.4	0.9	0.5	3.6	0.66
Brazil . . .	13.0	3.4	3.0	6.0	25.4	0.63
United States	40.0	1,001.0	481.0	121.0	1,643.0	13.38

The basis upon which this table has been calculated is explained in the *American Economic Review* (March 1933, p. 55). It appears from it that while the significance of water power is about the same in South America as it is in the United States (corresponding to somewhere between 5 and 10 per cent of the total energy output), the relation of coal and petroleum is reversed, since here about two-thirds of the total work is done with coal, while in South America it is petroleum which contributes the two-thirds. This, however, is not because petroleum consumption there is large but because coal consumption is small. In the United States the per capita output of work is 13.38 horse-power hours per day, or over seven times that of Chile, and in Europe the corresponding output is two or three times that of the most developed South American country.[3]

A question is sometimes raised regarding the soundness of industrial development in regions notably deficient in coal, and in the face of relatively small domestic markets. It is true that the great centers of manufacturing industry have appeared in the world first in those regions well supplied with near-by sources of coal, as in Great Britain, Belgium, Germany, France, and the United States. But many of these industries, such as the original cotton-textile industry in England, required the importation of raw materials, and in New England both raw materials and coal had to be imported. South America is generally deficient in coal, especially in Argentina; but it is well off in other sources of power, having 16 per cent of the world's petroleum, and 15 per cent of the world's

[3] Quoted by permission of Harper and Brothers, publishers, from H. F. Bain and T. T. Read, *Ores and Industry in South America*, New York, 1934, p. 9.

potential supply of water power. Brazil and Chile are better off than Argentina on the latter score. And all the South American countries are potential producers of abundant raw materials—the basic foods, leather, cotton and wool, and, especially in Brazil, iron and manganese. There seems little reason to predict that if the urban-industrial way of living continues to invade the continent as it is now doing, the necessary connections with the fundamental resources of the land cannot be made, even if these connections have to be somewhat different in nature from those in the older industrialized parts of the world. Here again it is technical ability, attitudes, and the economic condition of the period which direct man's relation to the land, not the physical resources themselves.[4]

Commercial Rivalries in Latin America

Between 1890 and the First World War trade between the United States and Latin America was increasing, but between 1914 and 1929 the increase was very rapid. During the last two decades British trade with the Latin-American countries has remained steady. Meanwhile, there has been a big increase in the total of Latin-American foreign trade which has been taken up by the United States, Germany, and Japan. Germany and Japan came forward rapidly during the period from 1930 to 1939, and their advance was largely at the expense of the United States. The following table gives the share of the four leading commercial nations in three critical years: 1929, just before the depression; 1933, at the depth of the depression; and 1936, just as the big German trade drive began.

SHARE OF LATIN-AMERICAN TRADE AMONG LEADING COMMERCIAL NATIONS*

Per Cent of the Total Latin-American Trade of These Countries

Nation	*1929*	*1933*	*1936*
United States	60.3	48.0	49.6
United Kingdom	24.0	32.2	23.1
Germany	14.8	17.5	23.6
Japan	0.9	2.3	3.7

The character of the trade of each of these four nations with Latin America is essentially different from that of the others. The British send

[4] See George Wythe, "The New Industrialism in Latin America," *Journ. of Political Economy*, Vol. 45, 1937: 207–228.

* From H. J. Trueblood, "Trade Rivalries in Latin America," *Foreign Policy Reports*, September 15, 1937.

staple manufactured articles and coal, and purchase meats and grains. The leading country in terms of British trade is Argentina. None of the other commercial nations has been able to make an effective attack on the strong position of Great Britain in this most productive country—and of all the foreign commerce of South America, Argentina accounts for half. Germany and Japan based their big trade drives on the exchange of Latin-American surpluses, such as Brazilian cotton and Chilean nitrate, for machines and other manufactured goods. By a system of barter, the Germans especially were able to offer what seemed to be very favorable terms. But both German and Japanese trade was largely involved in war preparations, and in neither case can the gain made be considered an economic trend. The outbreak of the Second World War put a stop to direct German trade.

Meanwhile the trade of the United States with Latin America is mainly in commodities which are purchased in time of prosperity but which may be dispensed with in time of depression. This includes various kinds of machines, from locomotives and mining machinery to sewing machines and electrical devices. With the rise of manufacturing industries in Latin America, the competitive position of the United States is benefited, for the higher the purchasing power in Latin America, the more these articles from North America will be in demand. These products of the North American factories cannot be paid for, however, unless Latin-American goods—either raw materials or manufactured articles—are admitted to the United States, whether or not they seem to compete with our own products.

Commercial Situation of the Western Hemisphere

The question is frequently raised regarding the possibility of forming a self-sufficient commercial bloc within the Western Hemisphere. Admittedly such a program is one which would require a considerable rearrangement of the normal routes of trade, for the hemisphere as a whole has played the role of a great producer of raw materials. Even the United States, after it had become an industrial country, continued to export such raw materials as cotton, wheat, and minerals. The development of manufacturing industries in certain parts of Latin America, while important locally, does not materially change the picture of Latin America as an exporter of raw materials and an importer of coal and manufactured goods. Furthermore, most of the trade of the Western Hemisphere is with places outside the hemisphere. Of the exports of

all the countries of the Western Hemisphere in 1937, only 39 per cent went to other American countries; and of the imports, only 43 per cent came from other countries in the Western Hemisphere. But the question is whether these normal currents of trade can be so diverted that the hemisphere can form an economic unit, essentially free both from the raw materials and from the markets of Europe and Asia.

The answer is that this is not possible; and there are two chief reasons for this answer.[5] The first has to do with the potential market within the hemisphere for the raw material surpluses. Such a market in order to be of significance on a world scale must be offered by one of the major industrial regions, not by the minor districts with only local significance. The major industrial regions of the world are all in the northern hemisphere: in northeastern United States; in Great Britain; and on the European continent in northern France, Belgium, and western Germany. No other regions of urban industrial development are in any way comparable to these. But the North American industrial region alone could not absorb all the raw material surpluses of the hemisphere, especially as so many of the Latin-American surpluses duplicate those of the United States. The chief raw materials produced in excess of hemisphere needs were (in order of value for 1937): petroleum, wheat, cotton, copper, meat, maize, and tobacco. The United States produces its own surplus of all of these commodities except maize; and the Argentine maize, which furnishes most of the world's exports of this grain, is sold almost exclusively in Europe (40 per cent in Great Britain). The chief petroleum surpluses come from the United States and Venezuela; the cotton surpluses come from the United States, Brazil, and Argentina; the copper surpluses come from Chile, the United States, and Canada; the meat surpluses come from Argentina, Canada, the United States, Brazil, and Chile; the tobacco surpluses come from the United States, Brazil, and Canada. Obviously, then, the Latin-American surpluses only aggravate the problem of disposing of similar products already present in the United States, and any serious attempt to shut off the hemisphere in a closed economic bloc would result in financial disaster for the regions of the hemisphere which have been most productive commercially and so have the highest material standards of living.

The second reason for recognizing the impossibility of developing a

[5] See especially the articles by P. W. Bidwell and A. R. Upgren, "A Trade Policy for National Defense," *Foreign Affairs*, Vol. 19, 1941: 282–296; A. H. Hansen, "Hemisphere Solidarity," *Foreign Affairs*, Vol. 19, 1940: 18–21; and R. B. Hall, "American Raw-Material Deficiencies and Regional Dependence," *Geographical Review*, Vol. 30, 1940: 177–186.

self-sufficient economy within the Western Hemisphere has to do with raw-material deficiencies. A modern urban industrial society must depend on a wide geographic base for essential supplies of agricultural and mineral products. There is no difficulty in finding a sufficient amount of such supplies in the world as a whole, now that technological progress has made such amazing advances. But the sources of the essential raw materials are, unfortunately, very unevenly distributed; and the fact is that there are certain raw materials which are not available from Western Hemisphere sources. Many of these products are used in small quantities, yet they are of vital necessity in the construction or maintenance of modern machinery, on which the foundations of the industrial society rest. In many instances substitutes might be provided, but at a cost which could be supported only under the necessities of a major emergency.

The raw material deficiencies of the Western Hemisphere include thirteen chief commodities—eight mineral and five vegetable. The chief mineral deficiencies are tin, manganese, chromium, tungsten, antimony, magnesite, mercury, and potash. The chief vegetable deficiencies are rubber, quinine, silk, manila fiber, and certain vegetable oils. There are sources of many of these items in the Western Hemisphere, but they are not sufficient. Although the United States uses more than half of the world's tin, there are no tin ores available in the Western Hemisphere except in the highlands of Bolivia and northwestern Argentina. Furthermore, until recently there were no smelters of tin in the Western Hemisphere—for reasons previously explained (in the section on Bolivia). The United States is dependent on tin supplies from outside of the hemisphere. A similar situation exists in the case of manganese and chromium. Brazil and Cuba produce small quantities of these ferroalloys, together supplying a little over 20 per cent of the needs of the United States for manganese, and 13 per cent of the needs for chromium. Small quantities of tungsten are produced in Bolivia, Peru, and Mexico; antimony is supplied in considerable quantities from Mexico and Bolivia; but the other mineral deficiencies are almost entirely lacking.

Perhaps the most serious deficiencies among the vegetable products are rubber and quinine. Both of these commodities were originally derived exclusively from South American sources—rubber from the Amazon, and quinine (from the bark of the cinchona tree) from the eastern Andean slopes between Colombia and Bolivia. But the plantations of Malaya and The Netherland Indies now completely dominate the market. Of the 500,000 tons of rubber consumed annually in the

United States, the most optimistic estimates indicate that Brazil might, after a lapse of several years, supply 10 per cent. The possibilities of developing new plantations in such other countries as Haiti and Ecuador seem more promising, but even if a rapid increase in rubber planting takes place, the goal of hemisphere self-sufficiency in this commodity could not possibly be achieved. The possibility of producing rubber depends so much on inexpensive but efficient labor—a resource which southeastern Asia possesses in abundance—that Latin America can scarcely be expected to compete with the Asiatic sources of these products in the predictable future. There is no escaping the conclusion that the attempt to build a closed economy within the hemisphere could result only in disaster to the civilization which is dependent on these missing raw materials.

Furthermore, this problem of hemisphere solidarity cannot be dismissed without a consideration of the sentiments which are involved in it. Pan American unity is, in fact, a distinctly artificial concept. Most of the Latin-American peoples have closer cultural connections, as well as closer economic connections, with Europe than with North America. Only the Caribbean countries come under the commercial domination of the market in the United States. Argentina—commercially the most progressive country in Latin America—has much closer ties with Great Britain. In the realm of ideas, the objectives and attitudes of the people of Spanish and Portuguese ancestry are, in general, much more understandable to Europeans than to Anglo-Americans. Also, the time is still too recent when the United States was acquiring territory at the expense of the Latin Americans—Texas, the southwest and California, the Canal Zone, and Puerto Rico. The "Yankee Peril" cannot be eradicated from the minds of the people to the south of the United States by only a decade of "good neighborliness." Argentina, especially, challenges the right of the United States to dominate the councils of the hemisphere, even in the economic field. None of these countries has any sentimental attachment to the United States which would weigh against the practical fact that most of the essential foreign markets for surplus products are to be found in Europe—whether in Great Britain or in Germany.

There is one point, however, on which all the states of the Western Hemisphere think alike. Each one is deeply jealous of its own political sovereignty, its own freedom from outside interference. This feeling for political independence springs from the common historical experience of the peoples of the Western Hemisphere. It is directed as much against

one another as against interference from Europe. Penetration by the United States is resented and feared fully as much as penetration by European states. Moreover, the menace of foreign interference is felt in Latin America to apply as much to penetration by Great Britain as to penetration by Germany, Italy, or Japan. Great Britain has aroused the ill feeling of Latin Americans through the occupation of territory claimed by Western Hemisphere nations—the Falkland Islands, for example, which are still claimed by Argentina. While it is true, therefore, that if the Western Hemisphere and the British Empire could be brought together in a single economic bloc, many of the problems of surpluses and deficiencies might be solved, the fact still remains that the domination, economic or otherwise, of the English-speaking peoples over the Latin-Americans would be feared no less than the potential menace of the "Axis Powers." These considerations of sentiment are not to be overlooked in planning a new world order.

The importance of the political, economic, and social problems of hemisphere solidarity should not be permitted to obscure the fact that most of the people who live in Latin America are not involved in these matters. A review of the activities of the inhabitants of the numerous clusters of people throughout Latin America leads us to the estimate that not much less than two-thirds of the population is entirely untouched by the problems of international commerce and of the relations between states. These two-thirds, engaged in producing from the land the bare necessities of food, clothing, and shelter, are not affected by such things as surpluses and raw-material deficiencies, nor do many of them share the sentiments of nationality which motivate the other third. While the intellectual, professional, and governing classes in Latin America are widely educated and thoroughly in touch with modern problems, the majority of the inhabitants of the countries in Middle and South America are illiterate and have only the vaguest concepts regarding the lands and problems which lie over the immediate horizon. Between these dwellers in the rural districts, smaller towns, and villages and the people who live in the modern metropolises the contrasts are so profound that the development of a coherent society seems all but impossible.

The map of population does not distinguish between all these different kinds of people, nor does it suggest the variety of kinds of communities which are actually to be found in Latin America. The long search for new sources of wealth, for the sacred lake of El Dorado, has brought groups of settlers into many diverse regions, forming new zones of con-

centrated settlement, only to leave the majority of the people behind as the search is directed elsewhere. From these regions of decadence the most energetic and successful of the inhabitants have moved away, leaving the stranded remnants poverty-stricken, isolated, hopeless, and dependent on the local resources for a mere subsistence. All over Latin America such groups are to be found: on the coffee lands of Puerto Rico; in the dead mining communities of Mexico and Peru; along the banks of the Amazon where, more than thirty years ago, there was a frenzy of activity in the production of rubber; in the decadent coffee and sugar zones of Minas Gerais, and in the vast sertões beyond; in the inactive nitrate ports of Northern Chile; and on the remote sheep ranches of southern Patagonia where the decline of wool prices left the sheep men with no product to sell.

The map of population also includes other clusters of people, other zones of concentrated settlement, which have survived the passage of the centuries almost without change. These are the places where the highland Indians remain almost unmixed with the Europeans: the out-of-the-world villages of Atacama; the agrarian communities of Bolivia and Mexico; the villages of Indian shepherds in the Andes of southern Peru.

Against this background of varied lands and varied peoples now comes the most modern form of community—the industrial city. Around the new urban centers more and more of the rural people are attached, first economically and then in other ways, to the life of the city. The new way of living is so fundamentally different from the way of living of a feudal society that the contrasts and cleavages have, for the moment, been made greater than ever before. But industrial society, welcomed or not, will bring certain changes to Latin America, and these changes cannot long be resisted. There will be a greater productive capacity for each person, and supposedly, therefore, a wider opportunity for the fuller enjoyment of life. There will be an attack on the problems of illiteracy, hygiene, and diet. Step by step the people now engaged in subsistence living will be reclaimed as a part of the new society. Suddenly someone will realize that here in this great reservoir of population, now living unproductively, lies the real wealth of El Dorado for the man or the government that can bring order and coherence out of all these diverse elements.

APPENDIX A

CLIMATIC DATA FOR SELECTED STATIONS[1]

SOUTH AMERICA

Station	*Altitude* (in feet)	*Time of Record* (temperature)	*Time of Record* (rainfall)		*T.* = *Temperature in Degrees Fahrenheit; Rf.* = *Rainfall in Inches*												
					Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Maracaibo	26.3	1918–1925	1920–1925	*T.*	80.6	81.0	81.1	82.6	83.1	83.5	84.2	84.4	83.5	82.0	81.3	81.0	82.4
				Rf.	0.0	0.0	0.3	0.5	2.4	1.6	1.4	1.3	3.3	4.3	2.5	0.4	18.0
La Guaira	Coast Level	3 years	1920–1925	*T.*	78.4	78.4	79.3	80.2	81.1	81.7	81.1	82.6	82.9	82.6	81.5	78.8	80.7
				Rf.	0.5	0.2	0.8	0.2	0.6	0.9	1.0	1.1	1.1	1.2	1.6	1.5	10.7
Caracas	3415.4	1895–1925	1891–1925	*T.*	64.4	64.9	65.8	68.2	69.4	68.7	68.0	68.4	68.5	68.4	67.3	65.3	67.3
				Rf.	0.9	0.4	0.6	1.6	2.8	4.3	4.1	4.3	4.0	3.9	3.4	1.7	32.0
Mérida	5380.6	1918–1925	1918–1925	*T.*	64.0	65.1	65.5	66.6	66.6	66.0	66.0	66.7	66.4	66.0	65.1	64.2	65.7
				Rf.	2.6	1.5	3.8	6.7	11.2	6.9	4.0	5.7	6.3	9.9	8.0	3.3	69.9
Ciudad Bolivar	124.7	1919–1924	1917–1925	*T.*	78.8	79.9	81.0	82.2	82.4	80.1	79.7	80.8	81.7	81.7	81.0	78.8	80.7
				Rf.	0.5	0.2	0.2	0.9	2.6	5.6	6.2	6.3	3.1	3.4	3.4	1.9	34.3
Medellín	4950.73	1875–1879	15 years	*T.*	70.9	71.6	70.9	70.7	70.9	70.7	70.5	70.7	70.5	69.4	69.1	69.8	70.5
				Rf.	2.7	3.5	3.3	6.6	7.7	5.5	4.1	4.6	6.2	6.9	5.2	2.5	58.8
Bogotá	8727	6½ years	1866–1885 1894–1922	*T.*	57.9	58.3	59.0	58.8	58.6	58.3	57.2	57.2	57.4	57.9	58.3	57.9	58.1
				Rf.	2.3	2.6	4.0	5.7	4.4	2.4	2.0	2.2	2.4	6.3	4.7	2.6	41.6
Pasto	8510.5	1924–1925	1924–1925	*T.*	55.9	56.7	57.2	57.7	59.0	57.6	57.7	57.9	57.2	57.7	57.0	57.4	57.4
				Rf.	1.3	1.7	3.4	3.1	0.9	2.6	1.0	0.3	4.6	2.4	7.6	3.4	32.3

[1] Sources, 17, 200, 201, and 202.

Quito	9350.4	1895–1907	16 years	*T.*	54.7	54.5	54.5	54.5	54.7	54.7	54.5	54.7	54.9	54.7	54.5	54.7	54.6
				Rf.	4.2	4.3	5.2	7.4	5.0	1.5	0.9	1.5	3.0	3.7	3.8	3.8	44.3
Guayaquil	39.4	3 years	3 years	*T.*	79.3	79.3	79.7	80.4	78.8	77.4	75.4	76.1	77.2	76.6	78.4	80.2	78.2
				Rf.	9.7	10.5	7.4	5.3	2.1	0.7	0.4	0.0	0.1	0.4	0.3	1.9	38.8
Iquitos	347.8	1 year	7 months	*T.*	77.5	78.3	76.3	77.0	75.6	74.3	74.1	76.3	76.3	77.2	78.4	77.9	76.6
				Rf.	10.0	10.6	12.0	6.6	9.8	7.3	6.5	4.5	8.8	7.1	8.5	11.3	103.0
Chiclayo	Coast Level	1909–1912	3–4 years	*T.*	76.1	78.3	77.4	73.2	68.9	63.5	64.0	64.6	65.0	65.6	68.0	72.9	69.8
				Rf.	0.0	0.1	0.5	0.0	0.0	—	0.0	0.0	0.1	0.0	0.0	0.0	0.7
Trujillo	196.9	1896–1915	2–4 years	*T.*	77.2	77.0	74.3	72.0	68.0	63.0	64.0	64.2	63.7	67.5	68.7	72.0	69.3
				Rf.	0.2	0.5	0.3	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	1.2
Cerro de Pasco	14,271.6	1909–1912	3–5 years	*T.*	44.1	43.2	44.1	44.1	42.6	41.0	40.5	40.8	41.0	41.7	42.3	42.4	42.3
				Rf.	4.6	4.5	3.6	3.4	2.3	0.9	1.1	1.2	2.8	3.3	3.4	3.7	34.8
Lima	518.4	1893–1897 1910–1919	18 years	*T.*	72.6	74.3	73.6	70.2	66.0	62.6	61.2	61.0	61.3	63.0	65.7	69.6	66.8
				Rf.	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.4	0.4	0.4	0.2	0.1	1.8
Santa Ana	3412.1	1894–1895	1894–1895	*T.*	71.6	71.1	71.4	72.1	71.8	71.1	70.2	70.7	72.3	73.9	74.1	73.2	72.0
				Rf.	9.8	6.6	8.1	3.5	2.8	1.2	0.3	1.1	5.6	4.0	1.5	7.3	51.8
Cuzco	11,089.2	1894–1898	12 years	*T.*	52.5	52.2	52.0	51.4	50.5	48.4	46.9	49.8	51.6	52.9	53.8	52.2	51.2
				Rf.	6.4	5.9	4.3	2.0	0.6	0.2	0.2	0.4	1.0	2.6	3.0	5.4	32.0
Vincocaya	14,370	1896–1900	1 year	*T.*	38.3	38.7	38.1	36.3	32.5	29.3	27.9	31.5	34.5	38.7	40.6	38.5	35.4
				Rf.	3.0	4.1	2.6	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.3	0.5	10.7
Arequipa	8041.3	1888–1920	1888–1924	*T.*	57.0	57.0	56.3	57.4	56.8	55.8	55.6	56.8	57.9	56.5	57.0	57.4	56.8
				Rf.	1.2	1.8	0.6	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	4.2
Mollendo	78.7	1889–1895	1888–1900	*T.*	70.2	70.7	69.6	67.3	65.3	61.7	59.5	59.4	59.9	62.1	65.8	68.4	64.4
				Rf.	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.2	0.2	0.1	0.1	0.0	0.8

Station	*Altitude* (in feet)	*Time of Record* (temperature)	*Time of Record* (rainfall)	*T.* = *Temperature in Degrees Fahrenheit; Rf.* = *Rainfall in Inches*													
					Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
La Paz	12,001.3	1918–1925	1898–1902	*T.*	50.4	50.4	50.0	48.4	47.7	44.8	43.5	46.2	49.3	50.0	51.8	51.4	48.7
				Rf.	3.8	4.9	2.6	1.5	0.5	0.1	0.2	1.1	0.8	1.3	1.6	4.2	22.6
Cochabamba	8448.2	3 years	1903–1918	*T.*	65.8	65.3	63.1	62.4	60.1	57.2	59.5	61.3	63.9	67.5	68.0	66.2	63.2
				Rf.	4.1	3.8	2.4	0.4	0.4	0.3	0.2	0.2	0.7	0.6	1.3	3.9	18.3
Arica	16.4	1911–1921	1903–1918	*T.*	72.3	73.0	71.6	68.4	65.7	63.1	61.3	61.2	62.4	64.0	66.9	70.0	66.7
				Rf.	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
Iquique	29.5	1911–1924	1886–1925	*T.*	69.8	69.6	67.6	65.1	63.1	61.3	60.1	60.3	61.2	63.0	65.7	68.2	64.6
				Rf.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Calama	7414.7	1913–1914	1913–1914	*T.*	62.4	59.7	58.1	54.7	51.8	47.5	46.4	55.8	54.3	58.3	60.3	61.9	55.9
				Rf.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Coquimbo	88.6	1911–1924	1900–1925	*T.*	64.0	63.7	62.1	58.8	56.8	54.3	53.6	54.0	55.0	57.0	59.4	61.7	58.4
				Rf.	0.0	0.0	0.0	0.0	1.1	1.5	1.1	0.5	0.2	0.0	0.0	0.0	4.4
Los Andes	2677.2	1911–1924	1905–1925	*T.*	71.2	70.2	65.7	59.5	53.1	47.5	48.7	51.4	54.3	59.9	65.1	69.3	59.7
				Rf.	0.0	0.0	0.1	0.4	2.2	2.5	1.3	0.9	1.0	0.2	0.1	0.1	8.8
Valparaiso	134.5	1911–1924	1869–1925	*T.*	63.7	63.1	61.3	58.1	55.6	52.3	52.3	53.1	54.1	56.7	60.1	62.4	57.7
				Rf.	0.0	0.0	0.4	0.6	3.8	5.7	4.0	2.6	1.3	0.4	0.3	0.2	19.3
Santiago	1706	1911–1924	1867–1925	*T.*	68.7	67.1	62.4	56.7	51.1	45.7	46.2	48.6	51.8	56.8	62.2	66.6	57.0
				Rf.	0.0	0.1	0.2	0.6	2.4	3.3	2.8	2.1	1.3	0.5	0.2	0.2	13.7
San Fernando	1099	1911–1924	1911–1925	*T.*	67.8	66.0	61.5	55.2	50.0	44.4	45.1	47.1	50.4	55.8	60.8	65.5	55.8
				Rf.	0.1	0.0	0.4	1.2	6.1	8.2	4.6	3.2	2.8	0.9	1.0	0.3	28.8

Contulmo	124.7	1911–1924	1911–1925	*T.*	62.2	61.0	58.5	54.9	51.8	48.2	48.4	48.2	49.8	53.6	56.1	59.7	54.4
				Rf.	1.3	1.4	3.3	6.6	12.5	10.9	11.6	8.8	6.5	2.6	4.2	2.3	72.0
Valdivia	19.7	1911–1921	1852–1925	*T.*	61.9	60.4	57.9	53.1	49.6	45.5	45.7	46.4	48.0	52.0	55.0	59.0	52.9
				Rf.	2.4	3.0	5.6	9.4	11.3	17.0	16.1	13.2	8.7	5.2	5.0	4.1	101.0
Puerto Montt	32.8	1911–1921	1862–1915	*T.*	59.5	58.1	55.9	52.3	49.6	45.9	45.9	46.0	47.3	51.1	53.6	57.0	51.8
				Rf.	4.6	4.4	5.9	7.4	10.6	10.0	10.8	9.3	6.3	5.5	5.5	5.4	85.7
Evangelistas	180.5	1911–1924	1899–1925	*T.*	47.5	47.5	47.1	44.4	42.1	40.3	39.6	39.4	40.6	42.3	43.2	45.5	43.3
				Rf.	11.5	10.4	11.2	11.6	9.6	9.4	9.2	8.5	9.0	8.7	9.9	10.1	119.1
Punta Arenas	91.9	1911–1924	1888–1925	*T.*	52.5	51.3	48.7	43.7	39.0	36.5	35.8	36.7	40.6	45.3	47.3	50.9	44.0
				Rf.	1.1	1.3	1.5	2.1	2.0	2.2	1.7	2.1	1.7	1.1	1.3	1.3	19.4
La Quiaca	11,358.2	1901–1920	1901–1920	*T.*	54.5	54.3	53.4	51.4	42.8	37.4	37.4	42.1	48.0	51.4	54.0	54.7	48.5
				Rf.	3.2	2.6	2.0	0.3	0.0	0.0	0.0	0.0	0.0	0.2	1.1	2.1	11.5
Jujuy	4166.7	1901–1920	1901–1920	*T.*	70.5	68.9	66.2	62.2	57.0	52.2	52.2	54.9	61.5	65.3	69.1	70.2	62.5
				Rf.	6.5	5.5	5.4	1.3	0.5	0.2	0.2	0.1	0.4	1.5	2.6	5.2	29.4
Salta	3894.9	1901–1920	1901–1920	*T.*	72.0	70.9	67.6	63.9	58.3	53.1	53.6	56.1	63.3	67.8	70.3	71.2	64.0
				Rf.	6.7	6.2	3.9	1.2	0.4	0.1	0.0	0.2	0.4	1.2	2.3	5.4	28.0
Tucumán	1476.4	1901–1920	1901–1920	*T.*	76.8	74.7	71.6	66.4	59.9	53.6	53.6	56.8	64.2	68.9	72.7	75.0	66.2
				Rf.	6.3	7.5	5.5	3.1	1.2	0.6	0.3	0.5	0.6	2.3	4.2	5.9	38.0
Santiago del Estero	623.4	1901–1920	1901–1920	*T.*	83.1	80.6	76.6	70.3	62.8	55.9	56.7	60.6	67.5	72.3	77.5	80.6	70.4
				Rf.	3.3	3.0	3.0	1.3	0.6	0.3	0.2	0.2	0.5	1.4	2.5	4.1	20.4
La Rioja	1673.2	1901–1920	1901–1920	*T.*	81.5	78.1	74.5	68.4	60.1	51.8	53.1	57.7	63.3	70.5	75.9	79.3	67.9
				Rf.	2.6	2.7	2.2	0.8	0.5	0.2	0.1	0.2	0.2	0.8	1.4	1.8	13.5
Córdoba	1387.8	1901–1920	1901–1920	*T.*	73.9	72.3	68.5	62.1	55.8	49.6	50.5	53.4	58.6	63.3	68.4	72.1	62.4
				Rf.	3.7	5.0	3.2	2.1	1.1	0.2	0.6	0.6	[illegible]	2.2	4.0	4.6	28.2

SOUTH AMERICA — *Continued*

Station	Altitude (in feet)	Time of Record (temperature)	Time of Record (rainfall)	T. = Temperature in Degrees Fahrenheit; Rf. = Rainfall in Inches													
					Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
San Juan	2178.3	1901–1920	1901–1920	*T.*	77.0	74.7	69.8	61.2	53.2	47.1	46.9	51.6	58.6	65.3	70.3	75.0	62.6
				Rf.	0.8	0.7	0.4	0.1	0.0	0.0	0.3	0.1	0.1	0.2	0.2	0.4	3.3
San Luis	2322.9	1901–1920	1901–1920	*T.*	75.2	72.5	68.5	61.5	54.3	48.0	48.6	51.6	56.1	63.7	69.1	73.4	61.9
				Rf.	4.2	4.1	2.3	1.5	0.7	0.2	0.4	0.4	0.7	1.3	2.8	3.6	22.2
Buenos Aires	82.0	1856–1924	1901–1920	*T.*	73.6	72.5	68.7	61.3	55.0	49.6	48.9	51.1	55.0	59.9	65.8	70.9	61.0
				Rf.	3.1	2.8	3.9	4.8	2.8	2.0	2.1	2.2	2.9	3.3	4.0	4.0	37.9
Mendoza	2477	1901–1920	1901–1920	*T.*	74.5	71.6	67.5	59.4	52.0	45.5	46.4	50.0	56.1	61.9	68.0	71.6	60.4
				Rf.	0.9	1.3	1.1	0.5	0.4	0.4	0.2	0.3	0.5	0.7	0.7	0.7	7.7
Mar del Plata	82.0	1901–1920	1901–1920	*T.*	66.9	66.4	63.9	59.4	52.7	47.3	46.2	46.8	49.6	53.2	58.8	63.7	56.2
				Rf.	2.1	3.1	3.1	3.1	1.9	2.4	2.1	1.8	2.6	2.4	2.6	2.7	29.9
Bahía Blanca	82.0	1901–1920	1901–1920	*T.*	74.5	71.6	67.5	60.1	53.1	47.1	46.4	48.9	53.6	59.2	66.4	71.8	60.0
				Rf.	2.2	2.4	2.2	3.5	1.1	0.6	0.9	0.7	0.7	3.4	1.9	2.0	21.6
Choele Choel	456.0	1901–1920	1901–1920	*T.*	75.4	72.5	67.3	58.5	51.3	44.8	45.1	47.7	53.1	59.9	66.7	72.1	59.5
				Rf.	0.7	0.7	1.0	0.9	1.1	0.6	0.5	0.3	0.8	0.9	0.5	0.6	8.6
Col. 16 de Octubre	1837.3	1901–1920	1901–1920	*T.*	60.6	58.8	54.9	47.7	42.3	37.0	36.7	38.7	42.8	48.4	51.8	55.9	48.0
				Rf.	0.5	0.5	0.8	2.2	3.2	2.8	1.5	2.0	0.8	0.4	0.5	0.6	15.8
Santa Cruz	39.4	1901–1920	1901–1920	*T.*	58.6	57.6	54.7	47.7	40.8	35.2	35.2	38.3	43.5	48.7	52.9	56.3	47.5
				Rf.	0.6	0.3	0.4	0.6	0.4	0.5	0.4	0.6	0.3	0.3	0.4	0.7	5.5
Ushuaia	26.3	1901–1920	1901–1920	*T.*	49.6	49.1	46.8	40.5	36.7	33.3	33.6	35.2	39.2	43.0	44.4	49.1	41.7
				Rf.	1.7	2.1	1.7	1.9	1.5	1.6	1.2	0.9	1.2	1.5	1.9	1.8	19.0

Asunción	344.5	1893–1924	1893–1923	*T.*	80.4	79.9	77.9	72.1	66.6	62.6	64.0	66.0	69.6	72.5	76.1	79.9	72.3
				Rf.	5.4	5.5	4.2	5.3	4.5	2.8	2.2	1.5	3.1	5.4	6.0	6.1	52.0
Montevideo	82.0	1901–1924	1901–1924	*T.*	72.0	71.8	60.5	63.0	56.7	51.3	50.5	51.3	54.9	58.1	64.6	69.4	61.0
				Rf.	2.6	3.1	3.2	4.6	3.4	3.2	2.4	3.5	3.4	2.5	3.2	3.5	38.6
Belém	32.8	1893–1910	1912–1924	*T.*	78.1	77.4	77.7	78.1	78.8	78.8	78.6	78.8	78.8	79.5	79.9	79.3	78.7
				Rf.	7.6	13.3	17.0	17.8	11.8	9.1	2.3	2.8	0.6	0.5	0.6	2.6	86.0
São Luiz	65.6	1912–1921	1912–1919	*T.*	79.7	79.2	79.2	79.0	79.2	79.2	78.8	79.2	79.9	80.4	80.1	80.2	79.5
				Rf.	7.4	10.4	18.5	16.6	12.4	5.8	4.1	1.1	0.5	0.4	0.7	6.5	84.4
Quixeramobim	679.1	1896–1921	1910–1924	*T.*	82.9	81.9	80.8	80.4	79.5	79.2	79.5	80.8	82.0	82.9	83.3	83.5	81.4
				Rf.	3.7	4.3	7.0	7.0	5.2	2.5	1.3	0.6	0.1	0.1	0.4	1.4	33.6
Natal	9.8	1904–1921	1912–1920	*T.*	81.0	80.8	81.0	80.1	79.2	77.2	75.9	76.3	78.1	78.3	80.4	80.8	79.1
				Rf.	2.8	5.2	5.9	8.9	7.8	12.3	6.7	3.5	2.4	1.1	0.3	0.7	57.6
Recife	98.4	1911–1921	1875–1922	*T.*	82.0	82.0	82.2	81.7	79.9	78.3	77.0	77.4	79.0	80.6	81.3	82.0	80.3
				Rf.	2.0	3.5	6.3	8.6	10.8	11.2	10.3	6.3	2.7	1.0	1.1	1.1	64.9
Ondina	154.2	1909–1921	1910–1924	*T.*	78.3	78.8	78.8	78.1	76.6	75.0	74.1	73.8	74.5	76.1	77.2	78.1	76.6
				Rf.	2.8	5.7	5.9	11.7	10.2	9.5	7.5	4.8	3.8	4.4	4.7	5.9	76.9
Belo Horizonte	2811.7	1910–1912	1910–1919	*T.*	71.4	72.1	71.1	68.7	65.5	62.6	62.2	64.4	68.4	70.3	70.3	70.2	68.1
				Rf.	12.8	9.5	6.3	2.9	0.6	0.5	0.4	0.9	1.5	4.9	8.3	10.7	59.3
Rezende	1312.3	1913–1921	1912–1924	*T.*	73.8	74.1	73.2	70.2	66.0	62.6	62.2	63.9	67.5	69.4	71.4	72.5	68.9
				Rf.	10.8	11.2	7.6	4.2	1.4	1.1	0.9	1.0	2.1	4.6	8.0	9.2	62.1
Rio de Janeiro	196.9	1851–1920	1851–1925	*T.*	78.6	79.0	77.7	75.2	72.0	69.6	68.7	69.6	70.3	71.8	73.9	76.6	73.6
				Rf.	4.9	4.8	5.2	4.3	3.1	2.3	1.7	1.7	2.6	3.2	4.1	5.4	43.3
Ribeirão Preto	1824.2	1901–1917	1910–1922	*T.*	74.1	75.0	73.9	70.9	65.3	63.3	63.3	62.6	70.5	72.5	74.1	74.3	70.0
				Rf.	11.0	7.9	6.1	3.1	1.4	2.0	0.6	1.2	2.2	4.4	6.8	8.5	55.2

SOUTH AMERICA — *Continued*

Station	*Altitude* (in feet)	*Time of Record* (temperature)	*Time of Record* (rainfall)	*T. = Temperature in Degrees Fahrenheit; Rf. = Rainfall in Inches*													
					Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
São Paulo	2690.3	1902–1917	1902–1917	*T.*	68.9	69.1	68.0	64.6	60.4	58.6	57.9	59.0	61.5	63.0	65.5	68.0	63.7
				Rf.	7.7	8.7	5.6	2.2	2.5	2.2	1.7	2.0	3.2	4.7	7.2	8.5	56.2
Santos	9.8	1895–1917	1895–1917	*T.*	76.3	77.9	73.9	72.7	68.9	66.2	66.4	66.0	66.9	68.9	73.0	75.6	71.2
				Rf.	10.4	8.2	8.1	6.8	6.1	2.4	4.4	4.6	5.6	6.3	7.8	7.0	78.3
Curitiba	2979	1884–1910	1885–1925	*T.*	68.7	70.0	66.7	62.2	56.7	54.0	54.5	56.3	58.3	61.0	64.4	67.3	61.7
				Rf.	6.6	6.3	4.4	3.1	4.0	4.0	2.5	3.2	4.9	5.5	5.0	5.5	55.0
Paranaguá	13.1	1910–1919	1910–1919	*T.*	73.6	71.2	69.6	64.9	60.8	59.5	60.1	62.2	64.8	69.1	70.9	73.4	66.7
				Rf.	10.4	10.9	4.8	3.6	3.8	2.3	3.0	5.4	6.3	5.5	8.3	8.9	73.2
Blumenau	49.2	1915–1921	1915–1919	*T.*	75.9	75.6	72.5	70.5	64.9	59.2	58.3	60.6	63.9	67.3	70.5	73.6	67.7
				Rf.	7.9	11.1	6.5	3.9	3.4	4.1	2.0	3.9	4.7	3.9	3.0	4.8	59.2
Porto Alegre	49.2	1909–1922	1909–1922	*T.*	76.1	76.5	72.9	68.9	63.0	56.3	56.5	58.3	61.7	65.1	70.2	73.8	66.6
				Rf.	4.3	3.7	3.6	4.8	4.1	5.0	4.3	5.1	4.6	3.1	3.3	4.1	50.0
Manaus	147.6	1911–1921	1902–1926	*T.*	79.9	80.1	79.7	79.9	80.1	80.1	80.6	81.7	82.8	82.8	82.2	80.6	81.0
				Rf.	9.2	9.0	9.6	8.5	7.0	3.6	2.2	1.4	2.0	4.1	5.5	7.7	69.8
Santarém	65.6	1914–1919	1914–1920	*T.*	77.5	76.6	77.2	77.2	77.0	76.5	77.0	78.3	79.7	80.4	80.4	78.8	78.1
				Rf.	6.2	12.0	10.6	10.9	10.3	6.2	3.0	1.9	1.5	1.1	1.5	5.0	70.2
Corumbá	380.6	1912–1920	1912–1919	*T.*	80.2	79.5	80.1	78.6	73.9	69.4	70.5	72.7	76.6	78.4	79.9	80.1	76.7
				Rf.	6.4	6.7	4.8	5.0	3.3	1.9	0.3	1.3	2.3	3.9	6.0	7.4	49.2
Tres Lagôas	1148.3	1913–1919	1913–1919	*T.*	81.0	79.5	79.3	77.7	73.2	69.6	68.4	71.4	75.4	77.9	79.2	79.5	76.0
				Rf.	5.4	4.0	3.0	4.8	4.4	3.2	1.0	1.8	3.9	3.1	5.4	5.0	44.0

Station	Altitude (in feet)	Time of Record (temperature)	Time of Record (rainfall)		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Goiaz	1706.0	1912–1921	1912–1919	T.	74.3	74.8	75.4	75.9	74.7	72.3	72.3	75.2	78.1	77.7	76.1	74.7	75.1
				Rf.	11.9	11.7	11.4	5.0	0.4	0.5	0.0	0.4	1.8	4.8	8.7	10.2	66.8
Caxambú	2919.9	1914–1922	1912–1924	T.	68.8	68.3	67.6	64.8	59.7	57.4	56.8	59.3	63.9	66.8	67.3	68.0	64.1
				Rf.	12.4	9.8	7.3	2.9	1.8	1.3	0.6	0.9	2.5	5.0	8.1	9.3	71.1
Georgetown	6.6	1887–1924	1846–1922	T.	79.3	79.3	79.9	80.6	80.6	80.2	80.6	81.3	82.2	82.0	81.5	79.9	80.6
				Rf.	7.3	5.9	6.1	6.7	11.1	12.1	9.6	6.4	2.8	2.3	5.8	11.3	87.4
Port of Spain	131.2	1862–1900	1862–1926	T.	75.0	72.2	76.3	77.7	79.0	77.9	77.5	77.5	78.1	77.9	77.2	77.2	77.0
				Rf.	2.6	1.6	1.8	1.9	3.4	7.9	8.6	9.4	7.5	6.6	7.2	4.7	63.2

MEXICO

Station	Altitude (in feet)	Time of Record (temperature)	Time of Record (rainfall)	T. = Temperature in Degrees Fahrenheit; Rf. = Rainfall in Inches													
					Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Tampico	26.3–59.1	1889–1927	1889–1927	T.	66.0	68.2	71.8	76.5	80.2	82.0	81.9	82.4	80.8	77.2	72.3	66.9	75.5
				Rf.	1.5	1.2	1.0	1.5	1.9	8.7	4.9	4.8	10.8	5.0	2.0	1.6	44.9
Jalapa	4590.4	1894–1927	1894–1927	T.	57.6	60.1	63.5	66.6	67.6	66.6	66.2	66.4	65.5	63.5	61.0	58.8	63.6
				Rf.	1.9	2.3	2.4	2.9	4.4	12.4	6.8	6.5	10.8	5.7	3.0	2.4	61.5
Veracruz	23–52.5	1878–1927	1878–1927	T.	70.8	71.2	74.1	77.9	80.6	81.3	80.6	81.1	80.1	78.4	74.7	71.2	76.8
				Rf.	1.0	0.6	0.5	0.6	1.7	11.4	13.0	10.7	12.0	5.7	3.1	1.0	60.3
Mérida	72.2	1894–1927	1894–1927	T.	72.7	73.6	77.9	80.6	83.3	81.7	81.5	81.1	80.6	78.4	75.4	73.2	78.3
				Rf.	1.1	0.7	1.0	0.9	2.6	7.0	4.5	5.4	5.3	3.3	1.6	1.1	34.6
Saltillo	5278.8–5344.4	1886–1927	1886–1927	T.	53.1	55.2	60.8	66.2	71.2	73.0	72.3	71.8	66.9	62.6	56.8	52.5	63.5
				Rf.	0.7	0.6	0.4	0.7	1.0	2.2	2.9	2.9	2.9	1.5	1.2	0.6	17.6

MEXICO — *Continued*

Station	*Altitude* (in feet)	*Time of Record* (temperature)	*Time of Record* (rainfall)		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
					T. = Temperature in Degrees Fahrenheit; Rf. = Rainfall in Inches												
Monterrey	1624.0	1886–1927	1896–1927	*T.*	57.7	62.6	68.0	73.8	78.4	81.5	81.7	82.4	77.9	71.6	63.5	57.6	71.3
				Rf.	0.6	0.7	0.8	1.3	1.3	3.0	2.3	2.4	5.2	3.0	1.5	0.8	22.9
Galeana	5426.5	1905–1927	1905–1927	*T.*	54.5	57.2	61.3	66.7	70.2	69.8	70.0	68.7	68.2	64.6	60.3	56.8	64.0
				Rf.	0.7	0.7	0.5	1.3	1.5	2.7	2.2	2.6	3.2	1.5	1.0	1.0	18.9
San Luis Potosí	6158.1–6223.7	1878–1927	1878–1927	*T.*	54.7	58.1	62.6	68.2	70.9	69.6	67.6	67.6	65.3	62.8	58.1	54.9	63.4
				Rf.	0.3	0.6	0.5	0.5	1.1	2.8	1.9	2.0	2.0	1.1	0.6	0.5	13.9
León	5902.2–5935.0	1878–1927	1878–1927	*T.*	57.2	60.4	65.5	70.5	73.8	71.6	69.3	69.0	67.8	64.8	61.0	57.6	65.7
				Rf.	0.3	0.3	0.4	0.2	1.1	4.9	6.1	5.1	4.7	1.3	0.5	0.5	25.4
Pachuca	7959.3–7992.1	1893–1927	1893–1927	*T.*	53.2	55.4	58.6	61.3	62.8	61.3	59.2	60.4	58.8	57.0	55.2	53.8	58.1
				Rf.	0.1	0.3	0.5	1.0	1.4	2.7	2.1	2.3	1.9	1.3	0.6	0.2	14.4
Mexico City	7486.9	1878–1927	1878–1927	*T.*	54.3	57.4	61.2	63.3	65.1	63.9	62.1	62.2	61.3	59.2	57.0	54.7	60.1
				Rf.	0.2	0.3	0.5	0.7	1.9	4.1	4.5	4.3	4.1	1.6	0.5	0.3	23.0
Puebla	7053.8–7175.2	1887–1927	1878–1927	*T.*	54.3	57.0	61.2	64.6	67.6	64.0	63.0	63.3	62.1	60.4	57.9	54.7	60.8
				Rf.	0.3	0.4	0.4	1.0	3.3	6.8	7.0	5.6	6.1	2.5	1.0	0.4	34.8
Chihuahua	4668.6	1900–1927	1900–1927	*T.*	50.0	53.4	60.1	66.4	73.4	78.8	76.6	75.2	71.4	64.8	55.4	49.3	64.6
				Rf.	0.2	0.4	0.3	0.2	0.2	1.7	3.6	3.7	3.3	0.9	0.5	0.4	15.4
Durango	6187.7–6243.4	1878–1903	1878–1927	*T.*	54.1	56.3	62.2	65.7	71.4	71.1	69.1	69.1	66.2	63.0	57.9	53.8	63.3
				Rf.	0.3	0.3	0.2	0.2	0.2	2.6	4.2	3.2	4.1	1.1	0.6	1.1	18.0
Zacatecas	8568.6	1878–1927	1878–1927	*T.*	50.7	52.7	55.6	61.3	65.1	64.2	60.8	61.2	59.4	57.6	54.9	51.1	57.9
				Rf.	0.5	0.3	0.4	0.2	0.9	4.1	4.1	3.4	3.5	1.6	0.6	0.6	20.2

Ensenada	19.7	1925–1927	1895–1927	*T.*	55.0	57.2	57.7	59.5	62.1	63.3	69.6	69.6	66.0	63.0	60.6	56.8	61.7
				Rf.	2.6	1.9	1.5	0.9	0.2	0.1	0.1	0.1	0.0	0.6	1.1	1.7	10.8
La Paz	32.8–39.4	1906–1927	1907–1927	*T.*	63.0	65.1	68.4	70.5	74.1	77.9	82.4	83.5	82.2	78.8	72.3	65.7	73.6
				Rf.	0.2	0.1	0.0	0.0	0.0	0.0	0.4	1.2	1.4	0.6	0.5	1.1	5.7
Ahome	111.6–278.9	1921–1927	1921–1927	*T.*	63.1	64.4	67.8	71.8	77.0	82.2	86.7	86.0	85.1	79.7	71.4	64.0	75.0
				Rf.	0.0	0.1	0.2	0.0	0.0	0.4	1.6	3.2	3.2	0.3	0.5	2.6	12.1
Mazatlán	13.1–255.9	1880–1927	1880–1927	*T.*	68.4	67.8	69.4	71.8	76.1	81.1	82.6	82.8	82.4	80.4	75.2	70.2	75.7
				Rf.	0.8	0.5	0.2	0.1	0.1	1.5	5.9	8.3	8.0	2.6	0.9	1.3	30.2
Guadalajara	5104.9–5193.5	1878–1927	1878–1927	*T.*	59.9	62.4	66.0	70.5	73.9	72.1	69.4	69.3	68.4	67.1	63.9	59.9	66.9
				Rf.	0.4	0.2	0.2	0.2	1.1	8.8	9.4	8.5	7.2	2.2	0.7	0.7	39.6
Manzanillo	9.8–23	1908–1927	1910–1927	*T.*	74.7	73.6	74.1	75.2	78.1	81.5	81.7	82.0	81.5	81.9	77.9	75.7	78.2
				Rf.	0.0	0.2	0.0	0.0	0.0	4.0	5.1	5.7	13.1	4.5	0.5	3.0	36.1
Acapulco	9.8	1920–1927	1920–1927	*T.*	77.9	77.7	78.8	80.4	82.6	82.8	82.6	80.8	81.1	82.9	80.2	78.6	80.5
				Rf.	0.6	0.0	0.0	0.0	1.7	16.5	6.0	6.3	14.7	5.9	1.9	0.7	54.3
Cuicatlán	1952.1	1906–1925	1906–1925	*T.*	71.4	73.0	75.7	80.1	81.5	79.2	77.7	79.0	77.5	76.1	72.5	70.9	76.2
				Rf.	0.0	0.2	0.2	0.5	0.8	4.1	3.0	2.5	2.5	1.3	0.1	0.2	15.4
Oaxaca	5036.1–5164	1878–1927	1878–1927	*T.*	62.8	65.8	69.4	72.5	72.9	70.7	69.4	69.8	67.1	65.3	68.5	63.0	68.1
				Rf.	0.1	0.2	0.6	1.5	3.2	6.7	3.5	4.1	4.9	2.0	0.4	0.2	27.4
Salina Cruz	49.2–183.7	1903–1907	1903–1927	*T.*	76.3	77.2	79.3	81.3	82.8	81.1	81.9	82.0	80.8	80.2	79.0	77.2	79.9
				Rf.	0.0	0.4	0.6	0.5	3.3	11.9	4.5	5.5	7.0	4.0	0.9	0.1	38.7
Comitán	5364.2	1912–1927	1912–1927	*T.*	59.9	62.2	64.8	66.9	67.5	66.0	64.9	65.3	65.5	63.9	61.3	61.7	64.2
				Rf.	0.5	0.5	0.3	1.7	4.7	9.1	4.6	4.2	5.9	4.7	1.0	0.4	37.6

CENTRAL AMERICA

Station	Altitude (in feet)	Time of Record (temperature)	Time of Record (rainfall)		T. = Temperature in Degrees Fahrenheit; Rf. = Rainfall in Inches												
					Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Belize	Coast Level	1888–1895	1888–1895	*T.*	74.8	76.8	79.2	79.9	81.9	82.4	82.6	82.6	82.0	79.3	76.1	73.6	79.3
				Rf.	5.1	2.6	1.6	1.5	4.1	9.1	9.6	8.5	9.4	11.0	10.2	6.3	79.0
Guatemala City	4888.4	1898–1902	1857–1902	*T.*	61.7	63.2	65.8	66.2	69.4	67.5	66.7	66.7	66.7	65.1	63.5	61.3	65.4
				Rf.	0.3	0.2	0.5	1.3	5.5	11.7	7.8	7.8	9.3	6.6	0.9	0.2	52.1
San Salvador	2155.5	1889–1902	1889–1902	*T.*	71.8	72.9	74.5	76.3	75.6	74.3	74.1	74.1	73.2	72.7	72.3	71.4	73.6
				Rf.	0.7	0.2	0.6	1.6	6.6	11.0	12.3	11.5	11.7	10.3	1.9	0.4	68.2
San Ubaldo	108.3	1900	1900	*T.*	79.5	80.8	82.9	86.4	85.8	82.9	81.3	82.9	83.1	80.6	80.2	81.1	82.3
				Rf.	1.2	0.2	0.3	0.0	7.4	9.8	24.9	5.3	14.1	8.9	1.4	0.6	74.1
Greytown	Coast Level	1898–1900	1890–1900	*T.*	77.5	77.7	78.8	80.8	80.8	80.1	79.2	79.3	80.4	80.2	78.4	77.5	79.2
				Rf.	23.3	11.3	6.5	11.4	20.4	23.2	34.4	27.3	17.4	20.0	36.5	27.8	259.4
San José	3723.7	1889–1900	1888–1895	*T.*	66.0	66.7	67.8	68.7	68.9	68.2	67.6	67.5	67.6	67.3	68.7	65.9	67.6
				Rf.	0.2	0.2	0.5	1.1	10.0	11.0	8.3	10.6	14.2	13.3	4.9	1.7	76.0
Colón	Coast Level	1907–1926	1907–1926	*T.*	79.9	79.7	80.2	80.8	80.4	79.9	79.9	80.8	80.4	79.0	78.6	79.9	79.9
				Rf.	3.5	1.7	1.5	4.5	12.2	13.9	15.5	14.8	12.6	15.2	21.7	10.8	127.9
Balboa Heights	98.4	1907–1926	1906–1930	*T.*	78.3	78.4	79.5	80.1	79.2	78.6	78.6	78.4	78.4	77.7	77.4	78.3	78.6
				Rf.	0.9	0.9	0.6	2.8	7.8	8.2	7.2	7.8	7.9	10.1	10.1	4.2	68.6

Station	Altitude (in feet)	Time of Record (temperature)	Time of Record (rainfall)	T. = Temperature in Degrees Fahrenheit; Rf. = Rainfall in Inches													
					Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Y ear
Habana	78.7	1899–1927	1899–1927	T.	71.4	71.8	73.7	76.3	78.6	80.4	81.7	81.7	80.8	79.0	75.0	72.7	76.9
				Rf.	3.0	1.5	1.7	1.7	5.1	5.6	4.3	4.3	5.0	7.1	3.2	2.4	44.9
Santiago de Cuba	114.8	1899–1920	1899–1921	T.	75.4	75.0	76.6	78.3	79.7	80.8	81.9	82.2	81.0	80.1	77.7	76.3	78.8
				Rf.	1.4	0.9	1.7	3.3	6.3	5.5	2.2	3.5	6.7	7.3	3.7	1.1	43.6
Kingston	23.0	1908–1927	1899–1927	T.	76.6	76.5	77.4	78.6	80.1	81.3	81.7	81.9	81.3	80.4	79.0	77.5	79.3
				Rf.	0.7	0.5	0.8	1.3	3.1	3.6	1.2	2.7	4.0	6.3	3.5	1.1	28.8
Port-au-Prince	121.4	1906–1927	1899–1927	T.	78.1	78.4	79.2	80.2	81.1	82.8	84.0	83.5	82.2	80.8	79.5	78.4	80.7
				Rf.	1.2	2.7	4.1	6.7	8.0	4.0	2.7	4.8	7.7	7.4	4.2	0.9	54.4
Ciudad Trujillo	59.1	1910–1927	1899–1927	T.	75.7	75.6	75.9	77.4	79.0	79.7	80.2	81.0	81.0	80.4	79.2	77.2	78.5
				Rf.	2.5	1.3	2.4	3.7	5.8	5.9	7.1	6.9	7.1	7.0	5.1	2.0	56.8
Ponce	78.7	1899–1927	1901–1927	T.	75.4	75.4	76.0	77.5	79.5	80.6	81.0	81.5	81.3	80.4	79.0	76.8	78.7
				Rf.	1.1	1.1	1.4	2.2	3.0	3.6	3.0	4.1	4.9	6.4	4.0	1.1	35.9
San Juan	98.4	1899–1927	1899–1927	T.	74.8	74.8	75.2	76.6	78.6	79.5	80.0	80.4	80.4	80.0	78.3	76.3	77.9
				Rf.	4.1	3.0	3.0	4.1	5.2	5.4	5.8	5.9	6.0	5.7	7.0	5.4	60.6
Christiansted	82.0	1899–1927	1899–1927	T.	76.6	76.3	76.8	78.4	80.2	81.1	81.9	82.0	81.9	80.8	79.5	77.7	79.4
				Rf.	2.0	2.1	1.4	3.0	3.4	3.5	3.2	3.7	5.4	5.6	5.1	3.2	41.6
St. John's	78.7	1890–1926	1866–1927	T.	76.1	76.1	76.6	76.0	79.2	80.1	80.4	81.0	81.0	81.7	78.8	77.5	78.7
				Rf.	3.1	2.4	2.2	3.2	4.1	3.9	4.7	4.8	5.8	5.7	5.5	3.7	49.1
St. George's	508.5	1891–1927	1899–1927	T.	76.8	77.2	77.7	78.8	79.7	79.0	79.1	79.9	80.2	80.1	79.3	78.1	78.8
				Rf.	4.4	3.1	2.5	1.8	3.7	8.0	9.4	9.1	7.3	8.1	8.0	6.9	72.3
Bridgetown	180.5	10 years	1899–1927	T.	76.3	76.5	77.0	78.4	80.1	80.2	80.1	80.1	79.9	79.3	78.6	77.2	78.6
				Rf.	2.1	1.7	1.5	1.8	1.7	4.5	4.7	6.0	6.4	6.5	5.0	3.5	45.4

APPENDIX B

EXPORTS OF TWENTY LEADING COMMODITIES FROM LATIN-AMERICAN REPUBLICS, 1938[1]

Petroleum

Quantity, 33,168,000 tons; Value, $317,361,000

Country of Origin	Per Cent	Country of Destination	Thousands of Dollars	Per Cent
Venezuela	79	United States	$ 36,807	12
Peru	8	Netherlands West Indies[1]	215,607	68
Colombia	6	United Kingdom	14,610	5
Mexico	5	Canada	13,192	4
Ecuador	–*	France	10,778	3
Argentina	–	Germany	4,602	1
		All Others	21,765	7

[1] This is almost entirely Venezuelan oil and statistics of the Netherlands West Indies show that it was reshipped chiefly to the United Kingdom, United States, and The Netherlands after being refined.

Coffee

Quantity: 26,178,033 bags; 3,462,726,000 lbs.; Value, $233,501,000

Country of Origin	Per Cent	Country of Destination	Thousands of Dollars	Per Cent
Brazil	57	United States	$133,533	57
Colombia	21	Germany	37,185	16
Venezuela	5	France	12,542	5
Guatemala	4	The Netherlands	7,493	3
El Salvador	4	Sweden	6,005	3
Mexico	2	United Kingdom	2,205	1
Costa Rica	2	All Others	34,538	15
Haiti	1			
Nicaragua	1			
Ecuador	–*			
Cuba	–			
Dominican Republic	–			
Peru	–			
Honduras	–			

[1] Latin American Section, Division of Regional Information Bureau of Foreign and Domestic Commerce, Department of Commerce, Reissued June 1940.
* Fractions of per cents not expressed.

Meats

Quantity, 725,014 tons; Value, $124,137,000

Country of Origin	Per Cent	Country of Destination	Thousands of Dollars	Per Cent
Argentina	80	United States	$ 5,748	5
Uruguay	10	United Kingdom	91,947	74
Brazil	9	Germany	6,768	5
Chile	1	Italy	3,881	3
Venezuela	–*	France	3,350	3
Cuba	–	Spain	3,142	3
Colombia	–	All Others	9,301	7

Sugar[1]

Quantity, 22,774,446 bags of 325 lbs.; Value, $115,704,000

Country of Origin	Per Cent	Country of Destination	Thousands of Dollars	Per Cent
Cuba	86	United States	$83,382	72
Dominican Republic	7	United Kingdom	21,224	18
Peru	5	Chile	2,769	2
Haiti	1	France	2,019	2
Argentina	–*	Germany	172	–*
Brazil	–	All Others	6,138	5
El Salvador	–			
Nicaragua	–			
Guatemala	–			
Costa Rica	–			

[1] Raw and refined

Copper[1]

Quantity, 483,762 tons; Value, $106,659,000

Country of Origin	Per Cent	Country of Destination	Thousands of Dollars	Per Cent
Chile	76	United States	$36,860	35
Peru	13	United Kingdom	24,621	23
Mexico	8	Belgium	10,119	9
Cuba	3	Italy	5,658	5
Bolivia	–*	France	5,278	5
		Sweden	4,218	4
		Germany	173	–*
		All Others	19,732	19

[1] Includes bars, concentrates, etc., but not alloys.

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* Fractions of per cents not expressed.

Wool

Quantity, 214,580 tons; Value, $92,187,000

Country of Origin	Per Cent	Country of Destination	Thousands of Dollars	Per Cent
Argentina	52	United States	$ 7,140	8
Uruguay	37	United Kingdom	21,098	23
Chile	6	France	9,881	11
Brazil	2	Germany	21,269	23
Peru	3	Belgium	4,018	4
		Italy	3,217	3
		All Others	25,564	28

Cotton

Quantity, 384,235 tons; Value, $76,535,000

Country of Origin	Per Cent	Country of Destination	Thousands of Dollars	Per Cent
Brazil	70	United States	$ 1,580	2
Peru	18	Germany	22,148	29
Mexico	5	United Kingdom	20,204	26
Argentina	5	Japan	13,172	17
Haiti	1	France	6,637	9
Nicaragua, Dominican Republic, Colombia	1	Italy	2,848	4
		All Others	9,946	13

Metals other than Copper and Tin[1]

Quantity, 2,673,464 tons; Value, $73,066,000

Country of Origin	Per Cent	Country of Destination	Thousands of Dollars	Per Cent
Mexico	64	United States	$30,781	42
Bolivia	9	Belgium	14,811	20
Peru	8	Germany	8,922	12
Cuba	6	United Kingdom	7,308	10
Chile	5	France	3,538	5
Argentina	4	The Netherlands	1,942	3
Brazil	3	All Others	5,764	8
All Others	1			

[1] Includes lead, zinc, tungsten, antimony, manganese, etc.

Hides and Skins[1]

Quantity, 276,560 tons; Value, $62,539,000

Country of Origin	Per Cent	Country of Destination	Thousands of Dollars	Per Cent
Argentina	50	United States	$14,941	24
Brazil	19	Germany	15,892	25
Uruguay	13	France	5,871	9
Chile	4	United Kingdom	5,662	9
Colombia	3	Belgium	3,130	5
Cuba	3	Czechoslovakia	2,585	4
Mexico	2	Poland	1,984	3
Peru	1	All Others	12,474	20
Bolivia	1			
All Others	4			

[1] Does not include furs.

Wheat

Quantity, 1,953,172 tons; Value, $61,438,000

Country of Origin	Per Cent	Country of Destination	Thousands of Dollars	Per Cent
Argentina	98	United States	—	–
Uruguay	2	Brazil	$29,597	48
		United Kingdom	8,284	13
		Belgium	4,011	7
		Germany	3,816	6
		Peru	3,454	5
		All Others	12,276	20

Linseed

Quantity, 1,316,258 tons; Value, $59,572,000

Country of Origin	Per Cent	Country of Destination	Thousands of Dollars	Per Cent
Argentina	95	United States	$15,348	26
Uruguay	5	The Netherlands	14,996	25
		France	6,436	11
		Belgium	5,060	8
		Germany	2,964	5
		Italy	2,051	3
		Sweden	1,926	3
		All Others	10,791	18

Maize

Quantity, 2,737,072 tons; Value, $59,299,000

Country of Origin	Per Cent	Country of Destination	Thousands of Dollars	Per Cent
Argentina	95	United States	——	–
Brazil	4	United Kingdom	$16,851	28
Cuba	–*	Germany	11,064	19
Dominican Republic	–	Belgium	9,930	17
Haiti	–	The Netherlands	6,716	11
Nicaragua	–	Irish Free State	3,288	6
		All Others	11,450	19

Nuts, Waxes, Oils, Chicle, Extracts

Quantity, 768,447 tons; Value, $37,739,000

Country of Origin	Per Cent	Country of Destination	Thousands of Dollars	Per Cent
Brazil	71	United States	$19,649	52
Argentina	12	United Kingdom	5,871	16
Mexico	7	Germany	2,670	7
Chile	3	France	2,507	7
Bolivia	2	Belgium — Luxembourg	2,127	5
Guatemala	2	All Others	4,915	13
Ecuador	1			
Uruguay	1			
Peru	1			
All Others	–*			

Cereals [1]

Quantity, 1,333,574 tons; Value, $32,059,000

Country of Origin	Per Cent	Country of Destination	Thousands of Dollars	Per Cent
Argentina	59	United States	$ 212	–*
Brazil	17	United Kingdom	6,483	20
Chile	14	The Netherlands	3,699	11
Uruguay	8	Germany	7,113	22
Mexico	1	Belgium	4,747	15
El Salvador	–*	Denmark	976	3
Dominican Republic	–	All Others	8,829	28
Honduras	–			
Nicaragua	–			

[1] Except wheat, maize and linseed.

* Fractions of per cents not expressed.

Nitrate[1]

Quantity, 1,519,615 tons; Value, $31,478,000

Country of Origin	Per Cent	Country of Destination[2]	Thousands of Dollars	Per Cent
Chile	100	United States	$12,591	40
		Egypt	3,179	10
		Germany	2,990	9
		France	2,958	9
		The Netherlands	1,196	4
		United Kingdom	1,133	4
		Italy	1,070	3
		Belgium	1,007	3
		All Others	5,354	17

[1] Includes iodine.
[2] Inasmuch as the Chilean government does not disclose the destination of nitrate exports, since 1933 the above data have been calculated by obtaining from each of the countries shown their tonnage of imports of this commodity. These respective tonnages were then figured against the total tonnage exported according to Chilean figures. The resulting percentages were used to calculate the individual values from the total value shown in Chilean statistics. That this system is fairly accurate is indicated by the fact that the United States' share of 40 per cent compared favorably with unofficial data showing that 42 per cent of Chilean total nitrate exports in 1937 and 1938 came here.

Bananas

Quantity, 73,609 stems; Value, $28,139,000

Country of Origin	Per Cent	Country of Destination	Thousands of Dollars	Per Cent
Colombia	18	United States	$22,249	79
Guatemala	17	United Kingdom	568	2
Honduras	15	Germany	1,842	7
Mexico	13	Argentina	1,173	4
Costa Rica	10	The Netherlands	1,155	4
Panama	10	All Others	1,152	4
Brazil	5			
Cuba	5			
Nicaragua	3			
Ecuador	2			
Haiti	2			

Tin

Quantity, 27,882 tons; Value, $24,793,000

Country of Origin	Per Cent	Country of Destination	Thousands of Dollars	Per Cent
Argentina	4	United States	$ 401	2
Bolivia	95	United Kingdom	20,715	84
Mexico	1	Belgium	1,733	7
		The Netherlands	1,247	5
		Germany	120	—*
		All Others	577	2

* Fractions of per cents not expressed.

Cabinet Woods, Lumber, and Quebracho

Quantity not available; Value, $21,705,000

Country of Origin	Per Cent	Country of Destination	Thousands of Dollars	Per Cent
Argentina	57	United States	$5,087	23
Brazil	21	Argentina	3,437	16
Mexico	12	Germany	2,561	12
Chile	5	Italy	1,467	7
Nicaragua	2	Japan	877	4
Cuba	1	United Kingdom	699	3
Ecuador	1	Peru	173	1
Guatemala	–*	All Others	7,404	34
Colombia	–			
Paraguay	–			

Cacao

Quantity, 206,382 tons; Value, $21,672,000

Country of Origin	Per Cent	Country of Destination	Thousands of Dollars	Per Cent
Brazil	57	United States	$14,464	67
Venezuela	14	Germany	4,305	20
Ecuador	13	The Netherlands	813	4
Dominican Republic	9	All Others	2,090	9
Costa Rica	4			
Panama	1			
Haiti	1			
Cuba, Guatemala, Mexico	1			

Fibers (Henequen, etc.)

Quantity, 153,108 tons; Value, $9,069,000

Country of Origin	Per Cent	Country of Destination	Thousands of Dollars	Per Cent
Mexico	60	United States	$5,640	62
Cuba	14	Germany	1,355	15
Chile	11	United Kingdom	346	4
Haiti	7	Belgium	212	2
Brazil	6	All Others	1,516	17
El Salvador	1			
Peru	–*			

* Fractions of per cents are not expressed.

APPENDIX C

REFERENCES

SOUTH AMERICA—GENERAL

Four outstanding books dealing with South America appeared in 1927 and 1930. In each of these four books there is contained a fund of authoritative information regarding the human and physical geography of South America, together with fundamental interpretations. These books also present extensive bibliographies which cover the chief sources of information up to 1930. The reader is referred to them for this material. In this appendix almost all the references are to materials which have appeared since 1930. For additional current references in all fields dealing with Latin America since 1935 see the annual *Handbook of Latin American Studies* (published by Harvard University Press, Cambridge, Massachusetts).

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A Guide to the Pronunciation of Spanish Place Names

Syllabication. A word has as many syllables as it has single vowels (Bu-ca-ra-man′-ga) or vowels and diphthongs (Bue′-nos Ai′-res). A single consonant between vowels forms a syllable with the following vowel (Li′-ma). Two consonants between vowels are separated (San-tia′-go), except when the second consonant is *l* or *r*, in which case both consonants form a syllable with the following vowel (Chi-cla′-yo, Su′-cre). **ch, ll,** and **rr** are considered single letters in Spanish and cannot be separated.

Accent or stress. In general, words ending in a consonant, except *n* or *s*, are stressed on the last syllable (La Li-ber-tad′). Words ending in a vowel, or in *n* or *s*, are stressed on the next to the last syllable (Gra-na′-da, Ma-ni-za′-les). Exceptions to this rule are shown by a written accent on the vowel of the stressed syllable (Que-ré-ta-ro, Tu-cu-mán, Bo-lí-var).

Vowels. **a** is pronounced as in f*a*ther (H*a*-b*a*′-n*a*). **e** is pronounced as *a* in f*a*te (San Jo-s*é*). **i** is pronounced as in mach*i*ne (N*i*-ca-ra′-gua). **o** is pronounced as in n*o*te (C*o*-l*ó*n). **u** is pronounced as in fl*u*te (Pe-r*ú*). **u** is silent after q (*Qu*e-ré-ta-ro); it is also silent in the combinations **gue** and **gui,** in which case it makes the *g* hard, as in *g*o (San Mi-*gu*el′). A diphthong is formed if the *u* in *gue* bears a diaeresis (Ca-ma-*güe*y′, pronounced Ca-ma-gwāī). **y** is a vowel when standing alone or at the end of a word, and is merely a graphical substitute for *i*. **y** is also a consonant (see under consonants).

Diphthongs consist of a strong vowel (*a*, *e*, or *o*) and a weak vowel (*i* [*y*] or *u*), or of the two weak vowels, and are stressed on the strong vowel. Common diphthongs are: **ua** and **ue**, the *u* approximating the sound of *u* in q*ua*lity (G*ua*n-to, pronounced G*wa*n′-to; B*ue*-na-ven-tu′-ra, pronounced B*wā*-na-ven-tu′-ra); **ai** (or **ay**) pronounced like *ai* in *ai*sle (Bue′-nos *Ai*′-res); **ei** (or **ey**) pronounced like *ey* in th*ey* (N*ei*′-va); **oi** (or **oy**) pronounced like *oy* in b*oy* (To-ron-t*oy*′); and **ia** in which the two syllables are slightly slurred in pronouncing them (San-t*ia*-go). Two strong vowels do not form a diphthong (Ca-ll*a*′-*o*).

Consonants. **d, f, l, m, n, p,** and **t** are pronounced as in English. **b** and **v** are similar to a combination of *b* and *v* in English. **c** before *e* or *i* is pronounced as *s* in *s*imilar (Va-len′-*c*ia); otherwise as in *c*a*c*tus (*C*a-ra′-*c*as). **ch** is pronounced as in *ch*ur*ch* (*Ch*ia′-pas). **g** is pronounced as in *g*o (Bo-*g*o-tá), but **g**, before *e* or *i*, and **j** are similar to the German *ch* (like English *h* forcibly hissed), as in Car-ta-*ge*′-na, *J*a-lis′-co. (See also the explanation of **gu** under vowels and diphthongs.) **h** is always silent (Hon-du-ras, pronounced ōn-du′-ras, and Hua-nu-co, pronounced Wa-nu′-co). **k** is not a Spanish letter; it is found only in foreign words, in which it has the same sound as in English. **ll** in Central America and in parts of Mexico is pronounced as *y* in *y*es (Ciu-dad Tru-ji-*ll*o, pronounced Sēudad Truhē′*y*o); in Spain and in some parts of Spanish America it has the sound of *lli* in mi*lli*on (Vi-*ll*a-ri-ca [Paraguay], pronounced Vē*ly*arē′ca); in southern South America and parts of Mexico it has the sound of *zh* in a*z*ure (A-ve-*ll*a-ne-da, pronounced Avā*zh*anā′da). **ñ** is pronounced like *ny* in ca*ny*on (Na-ri-*ñ*o, pronounced Narē′*ny*o). **q** is always followed by *u* and is pronounced as in li*qu*or (*Qu*e-ré-ta-ro). **r** is slightly trilled on the tip of the tongue; initial **r** is pronounced with more vibration, and **rr** is pronounced like initial *r*. **s** is pronounced as in *s*imilar. **x,** in Mexico, when between vowels, is pronounced like Spanish *j* (O-a-*x*a′-ca); otherwise like *s* in *s*imilar (Ta*x*-co, pronounced Ta*s*′-co); in other parts of Spanish America it is generally pronounced as in ta*x*. **y** as a consonant is pronounced as in *y*et, but with more force (Yu-ca-tán). **z** is always pronounced as *s* in *s*imilar.

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Syllabication. A word has as many syllables as it has single vowels (Pa-ra-ná) or vowels and diphthongs (São Pau′-lo). A single consonant between vowels forms a syllable with the following vowel (A-ma-zo′-nas). Two consonants between vowels are separated (San′-tos).

Vowels. **a** is pronounced as in f*a*ther (P*a*-r*á*). **e** is pronounced either as in b*e*t (P*e*r-nam-bu′-co) or as *a* in f*a*te (C*e*-a-rá). *i* varies from m*i*lk (Es-p*í*-r*i*-to San′-to) to mach*i*ne (San′-ta Ca-ta-r*i*′na). **o** varies from m*o*ral to c*o*ld, and, when final, is pronounced like *u* in fl*u*te (Cam-p*o* For-m*o*-s*o*, pronounced Cam′pu Fōrmō′su). **u** is pronounced as in fl*u*te (Per-nam-b*u*′-co). It is silent in the combination **gue** and **gui,** in which case it makes the *g* hard as in *g*o; the combination **gua** forms a diphthong as in Spanish (G*ua*-ra-tin-gue-tá, pronounced G*wa*ratingāta′). For the pronunciation of **u** after q, see **q** below.

Diphthongs consist of a strong vowel (*a*, *e*, or *o*) and a weak vowel (*i* or *u*), as in Mi′-nas Ge-r*ai*s′, or of the two weak vowels, as in J*ui*z′ de Fo′-ra. Exceptions to this rule are shown by a written accent (Ba-*í*-a). Two strong vowels do not form a diphthong (A-la-g*ô*′-*a*s).

Nasalization. The tilde always nasalizes the vowel it covers, silencing the following vowel and resulting in a sound approximating awng (São Pau-lo, pronounced, approximately, Sawng Pow′-lo). Final *m* nasalizes the preceding vowel (Be-lém [Bāleng′]; Jar-dim [Zharding′]), as does final *ns* (To-can-tins [Tocantings′]).

Consonants. **b, d, f, k, l, p, t,** and **v** are pronounced as in English. **c,** before the vowels *a* or *o* and before all consonants, is pronounced as in *c*actus (Cam′-pos); **c,** before the vowels *e* or *i,* and **ç** are pronounced as in *c*ement (*C*e-a-rá, Al-co-ba′-*ç*a). **ch** is pronounced as *sh* in *sh*awl (*Ch*a-pa′-da). **g,** before *e* or *i,* is pronounced as *zh* in a*z*ure (Mi′-nas *G*e-rais′); otherwise it is pronounced as in *g*o (Por′-to A-le′-*g*re). **h,** following *l,* is pronounced as *lli* in mi*lli*on (I*lh*e-os, pronounced Ilyā′ozh); following *n,* it is pronounced as *ny* in ca*ny*on (U-be-ra-bin-*h*a, pronounced Uberābin′ya); otherwise it is silent. **j** is pronounced as *zh* in azure (São *J*oão, pronounced Sawng *Zh*ōawng′). *m* is pronounced as in *m*other (Re-*m*e′-dios), except when it ends a word, in which case it loses its identity, combining with the preceding vowel to form a nasal (Be-lé*m*). **n,** before hard *g,* is pronounced as in si*ng* (Guarati*ng*uetá); *n,* before final *s,* nasalizes the preceding vowel (Tocanti*ns*); otherwise it is pronounced as in *n*ame (Dia-ma*n*-ti′-*n*a). **q** is always followed by *u;* **qu** before *e* or *i* is pronounced as in li*qu*or (Pe-*qu*e′-no); before *a* or *o* it forms a diphthong and is pronounced *kw* (Puer-ta Je-ri-co-a-*qu*a-ra, pronounced Pwer′ta Zhericōakwara). **r** is pronounced in the throat and slightly trilled. **s,** between vowels, is pronounced as in ro*s*e (Cam′po Formo′*s*o). When final, or when preceding *b, v, d, g, l, m, n,* or *r,* it is pronounced, in Portugal and in Rio de Janeiro, as *zh* in azure (Mi-na*s* Ge-rai*s* [Mē′na*zh* Zhārīz*h*′]); in the outlying districts of Brazil it is pronounced as *s* in *s*imilar in these instances. In all other cases it is pronounced as *s* in *s*imilar. **x,** between vowels, is pronounced as *z* in Ezekiel (Fa-*x*i′-ma [Fazēma]); otherwise, in Portugal and Rio de Janeiro, it is pronounced as *sh* in *sh*awl (*X*in-gú [*Sh*ingu′]), and in the outlying districts of Brazil as *s* in *s*imilar (*X*ingú [*S*ingu′]). Recent regulations have excluded the use of the letter **y.** **z,** before a vowel, is pronounced as in Ezekiel (San′-ta Lu-zi′-a); otherwise, in Portugal and Rio de Janeiro, it is pronounced as *sh* in *sh*awl or *zh* in azure (Santa Cru*z* [San′ta Cru*sh*′]), and in the outlying districts of Brazil it is pronounced as *s* in *s*imilar (Santa Cru*z* [San′ta Cru*s*′]).